COMMODORE USERS

Ahoy!

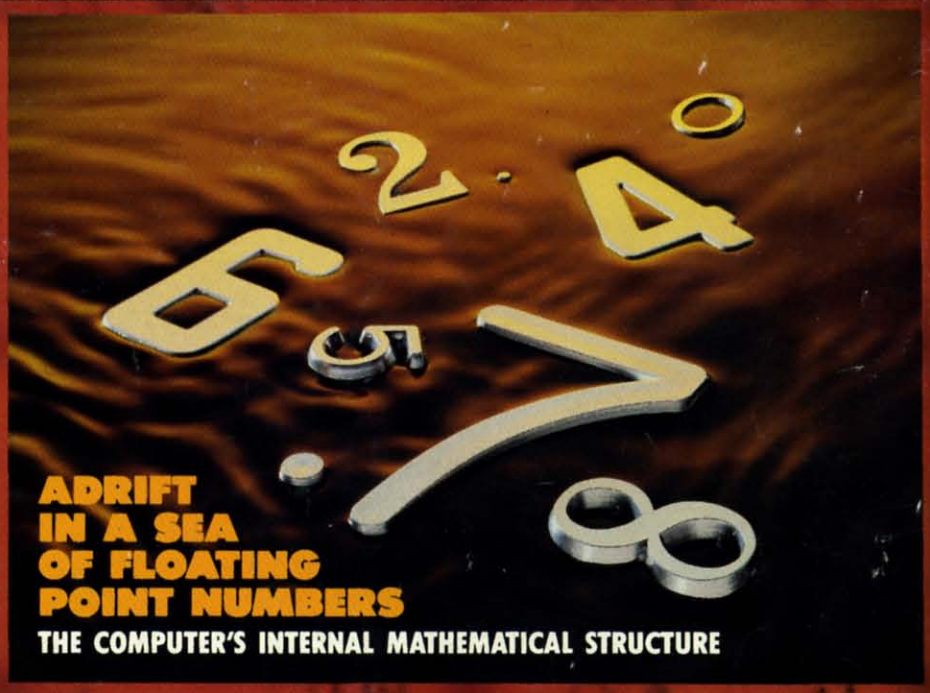
$2.95/ CAN. $3.75
DECEMBER 1988

. . NUMBER 1 WITH COMMODORE OWNERS! . .



SCREEN POCUS 64
MAGICAL FADE IN/ FADE OUT EFFECTS

REVIEWS
8 NEW ENTERTAINMENTS AND MORE



ADRIFT IN A SEA OF FLOATING POINT NUMBERS
THE COMPUTER'S INTERNAL MATHEMATICAL STRUCTURE



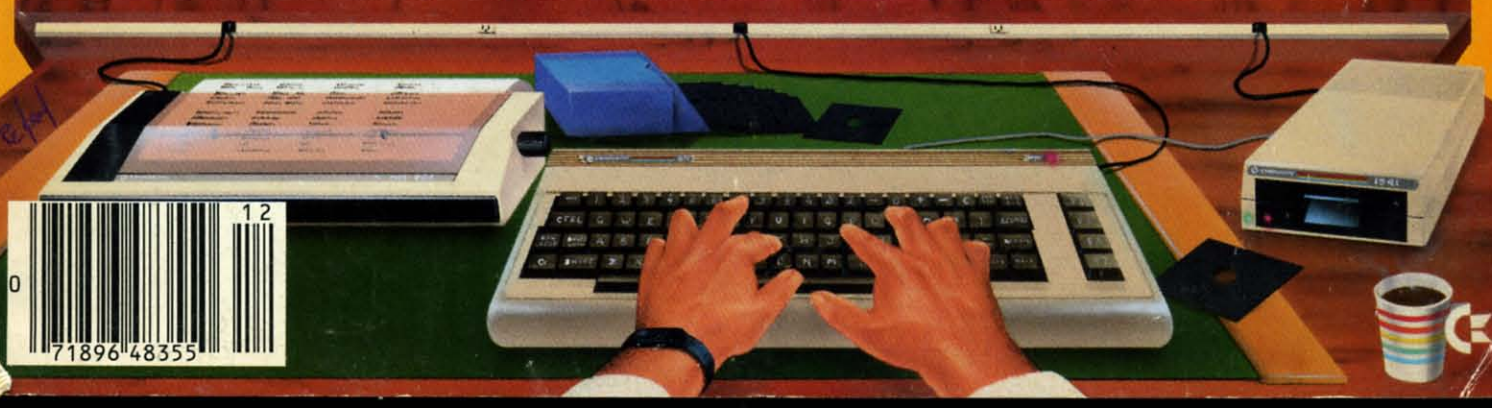
TIPS AHOY!
ELF-SIZED SUGGESTIONS

ART GALLERY
CHRISTMAS CANVASES

AND MORE FOR YOUR 64/128



COLLECT AND RECALL TEXT SCREENS



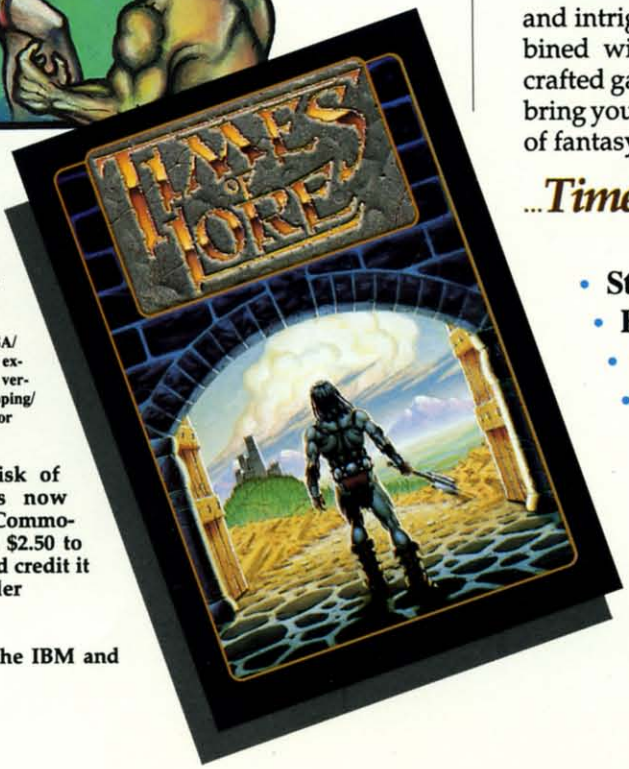
0 71896 48355 12

TIMES OF LORE

Arcade adventure at its finest...

Fast-paced, exciting combat demands the use of all your wits and endurance to best a world teeming with assassins, wizards and monsters. Experience captivating graphics of an unprecedented calibre. Relentless opponents will hone your combat skills to a razor's edge. A simple yet powerful menu and icon interface provides effortless interaction with the world and its people, while the incredibly smooth animation presents a continuous panorama of action and adventure.





To get your copy of Times of Lore, either
1) visit your local retailer,

2) call 1-800-999-4939 8am to 5pm EST to order by VISA/MC, or

3) mail check (U.S. $) or VISA/MC#, cardholder name and expiration date to Origin. All versions $39.95 plus $2.50 shipping/handling. Allow 1-2 weeks for delivery

Try it! A demo disk of Times of Lore is now available for the Commodore 64/128K. Send $2.50 to Origin for yours and credit it towards a direct order purchase.

Also available for the IBM and Apple II series.

Fantasy role-playing at its best!

Astonishing realism is yours through scores of unique characters and sophisticated conversations. Immerse yourself in the sights and sounds of an ancient world embroiled in turmoil—the disappearance of the king and his young child—the struggle for control of the realm. The stakes are high; your role as the hero-for-hire requires all the courage and savvy you can muster. Your quest for truth will teach you much of the distinction between appearances and reality. Magic and intrigue combined with finely crafted game-play bring you the best of fantasy in...



Screens shown are for the Commodore

...*Times of Lore*

- **Stunning graphics and animation**
- **Fast-paced combat action**
- **Dynamic conversations**
- **Compelling plot**

ORIGIN

Origin Systems, Inc.
136 Harvey Road, Building B., Londonderry, NH, 03053

Times of Lore is a trademark of Origin Systems, Inc.

THE COMMODORE USERS Ahoy! Access

clipper

OUR HOLIDAY SALES ARE SET!

The Clipper offers members of the *Ahoy!* Access Club discounts and other special deals on products and services advertised in *Ahoy!* and *Ahoy!'s AmigaUser.* Your membership is free for the duration of any subscription paid for prior to December 31, 1988.

Some of the offers are cross-referenced to ads in the December *Ahoy!* or *Ahoy!'s AmigaUser.* If you subscribe to only one of the two magazines and require information that appears in the other, contact the manufacturer directly.

To take advantage of any of this month's offers, follow the instructions on the front and back of the coupon. Fill in all necessary information. And use the original coupon only—facsimiles are not acceptable. For more information, call 212-239-6089 (if busy or no answer after three rings, call 212-239-0855).

Digitronics

Digitronics' ad on page 57 of this month's *Ahoy!'s AmigaUser* offers the fully assembled and tested RC4 Ramcard for $225. The card is configurable with ½ to 4 megs of RAM, and can be used with the Amiga 2000 or with the 500 via Digitronics' adapter box. *Ahoy!* Access Club members get to take **10% off** the list price, and pay only $202.50. You must add $4.05 for shipping via UPS ground service; if you want your unit shipped some other way, call Digitronics at 215-459-4493. (Offer expires December 31.)

10% OFF

Pacific Peripherals

Pacific Peripherals' line of Amiga hardware (advertised on page 28 of this month's *Ahoy!'s AmigaUser)* includes the OverDrive hard disk controller for the 2000 (with or without hard disk drive) and the SubSystem expansion chassis for the 500. For *Ahoy!* Access Club members who order from them direct, Pacific will **waive the normal credit card surcharge**, and provide **free shipping**. (OverDrive and disk drives go by UPS 2nd Day Air; the SubSystem by UPS Ground.) (Offer expires December 31.)

NO SURCHARGE: FREE SHIPPING

DigiTek Software

The fact that DigiTek markets so many programs for the Amiga and C-64 (see their ad on page 5 of this month's *Ahoy!'s AmigaUser)* makes their offer for *Ahoy!* Access Club members especially attractive. Buy any of DigiTek's programs directly from them for full price, and **take a second program for half price**; or, buy any two programs for full price and **take a third program free**! This offer is good on all DigiTek programs, including *Drum Studio, Skyblaster, Final Mission,* and *Amegas* (available for the Amiga only), and *Vampire's Empire* and *Hollywood Poker* (available for both the Amiga and 64). (Offer expires December 31.)

2ND DISK 50% OFF—OR 3RD FREE

SOFTWARE SUPPORT INTERNATIONAL

Even before its most recent update, the *Super Snapshot* utility cartridge had far too many features to list. Instead of trying to describe the new V4, we'll refer you to Software Support's ad on page 6 of this month's *Ahoy!* Also offered in that ad is the *Super Snapshot Slideshow Creator,* which allows you to combine *Snapshot*ed screens into presentations with professional video effects. *Slideshow* retails for $14.95; but when you buy *Snapshot V4* at the advertised price of $64.95, you can **buy *Slideshow* for just $9.95**. The shipping and handling charges outlined in the ad on page 6 apply. If you prefer to order by phone, call the number listed in the ad and mention that you saw this offer in the *Clipper.* (Offer expires December 31.)

$5.00 OFF

BRiWALL

Briwall, whose ad appears on page 34 of this month's *Ahoy!,* has Christmas gifts for both 64/128 and Amiga users. With every order of $75 or more, you can take a **free copy of Free Spirit's *Christmas Classics*** for the C-64 (list price $9.95). Or, with every order of $100 or more, take a **free copy of Free Spirit's *Christmas Classics*** for the Amiga (list price $14.95). Call Briwall toll free for more information: 800-638-5757. (Offer expires December 31.)

FREE DISKS

DUNE SYSTEMS

Dune Systems' Chip Checker hardware for the C-64/128 or PC (see page 45 of this month's *Ahoy!)* can help you save on the cost of computer diagnosis and repair. And the *Ahoy!* Access Club can help you save on the cost of the Chip Checker! Dune Systems is offering our members **$10 off** the $159 price of the 64/128 version—you pay $149. For the PC version, regularly priced at $259, you pay $244—**$15 off.** You must add $4.00 per unit for shipping. (Offer expires December 31.)

$10—$15 OFF

DISCOVERY SOFTWARE

Like their biologic namesakes, computer viruses are almost impossible to cure. But you can prevent them from infesting your Amiga with Discovery Software's *Virus Infection Protection (V.I.P.).* Purchase two or more Discovery Software products (see their ad on page 47 of this month's *Ahoy!'s AmigaUser)* before the end of December, either from your local retailer or direct from Discovery. Send in proof of purchase, with the date of purchase clearly indicated. In return, you'll receive a **free copy of V.I.P.**—a $49.95 retail value! (Offer expires December 31.)

FREE V.I.P.

☐ Enclosed is my check or money order for $206.55 ($202.50 plus $4.05 shipping). Send me the RC4 Ramcard, a $225 retail value.

NAME_____

ADDRESS_____

_____

CITY_____STATE____ZIP____

Send coupon to:
Digitronics
Ahoy! Access Club Clipper Offer
P.O. Box 206
Villanova, PA 19085

THE *AHOY!* ACCESS CLUB BBS

The *Ahoy!* Access Club BBS is up and running, for the exclusive use of Club members. To receive validation, call 212-239-6089 (if busy or no answer after three rings, call 212-239-0855). Have a recent subscription label handy, as you'll need to read that to us to be validated. At that time, we'll give you the phone number.

Don't share the number with your friends. Remember that every non-member to whom you give the number will give it to five others, and so on, and so on. While these non-validated callers will be unable to log on, their repeated attempts to do so will tie up the phone lines and make it more difficult for you to get through.

On the board you'll find advance, up to the minute information about future issues of *Ahoy!* and *Ahoy!'s AmigaUser;* just-announced products; forthcoming *Clipper* offers; and places to use your *Ahoy!* Access Club Card. Also, you'll be able to download public domain software, exchange electronic mail with other members, and do a whole lot more. Log on today and see!

☐ Enclosed is $153 ($149 plus $4.00 shipping) for the 64/128 Chip Checker—$10 off the advertised price.
☐ Enclosed is $248 ($244 plus $4.00 shipping) for the PC Chip Checker—$15 off the advertised price.

NAME_____

ADDRESS_____

_____

CITY_____STATE____ZIP____

Send coupon to:
Dune Systems
Ahoy! Access Club Clipper Offer
2603 Willa Drive
St. Joseph, MI 49085

☐ Enclosed is my payment for *Super Snapshot* ($64.95 plus the tax and shipping charges outlined in the ad on page 6 of the December *Ahoy!).* This entitles me to buy the *Super Snapshot Slideshow Creator* for $9.95 plus tax and shipping (payment enclosed).

NAME_____

ADDRESS_____

_____

CITY_____STATE____ZIP____

Send coupon to:
Software Support International
Ahoy! Access Club Clipper Offer
2700 N.E. Andresen Road #D13
Vancouver, WA 98661

☐ Enclosed is my order for the OverDrive hard disk controller or the SubSystem expansion chassis, with free shipping included. If ordering by credit card, I understand that the surcharge will be waived. If not ordering by credit card, my check or money order is enclosed.

NAME_____

ADDRESS_____

_____

CITY_____STATE____ZIP____

Send coupon to:
Pacific Peripherals
Ahoy! Access Club Clipper Offer
P.O. Box 14575
Fremont, CA 94539

☐ Enclosed is my proof of purchase, with date of purchase indicated, for any two Discovery Software products. Send me a free copy of *Virus Infection Protection* for the Amiga.

NAME_____

ADDRESS_____

_____

CITY_____STATE____ZIP____

Send coupon to:
Discovery Software
Ahoy! Access Club Clipper Offer
163 Conduit Street
Annapolis, MD 21401

☐ Enclosed is my order for $75 or more. Send me a free copy of Free Spirit's C-64 *Christmas Classics.*
☐ Enclosed is my order for $100 or more. Send me a free copy of Free Spirit's Amiga *Christmas Classics.*

NAME_____

ADDRESS_____

_____

CITY_____STATE____ZIP____

Send coupon to:
Briwall
Ahoy! Access Club Clipper Offer
P.O. Box 129, 56 Noble Street
Kutztown, PA 19530

Send me the program(s) indicated:

Vampire's Empire	*Hollywood Poker*
☐ C-64 ($29.95)	☐ C-64 ($29.95)
☐ Amiga ($44.95)	☐ Amiga ($34.95)
Amiga, $29.95:	Amiga, $34.95:
☐ *Drum Studio*	☐ *Skyblaster*
☐ *Final Mission*	☐ *Amegas*

☐ Enclosed is my payment for one program, plus payment of 50% off the listed price for the following program: _____
☐ Enclosed is payment for two programs. Send the following program free: _____

NAME_____

ADDRESS_____

_____

CITY_____STATE____ZIP____

Send coupon to:
DigiTek Software
Ahoy! Access Club Clipper Offer
104 West Seneca, Suite 4
Tampa, FL 33612

SunRize Industries' *Color Splitter* allows *Digi-View* and *Perfect Vision* users to digitize color pictures from VCRs or color cameras without using color filters. As you can see in SunRize's ad on the inside back cover of this month's *Ahoy!'s AmigaUser*, it retails at $99.95. But *Ahoy!* Access Club members who order direct from SunRize **save 25%**—they pay only $75.00! For more information on the *Color Splitter*, or such other SunRize products as *Perfect Sound, Studio Magic*, or *Desktop Artist*, call 409-846-1311. (Offer expires December 31.)

SAVE 25%

Central Coast

Once again, Central Coast Software invites *Ahoy!* Access Club members who own the *Quarterback* hard disk backup utility to upgrade to version 2.0. (At press time, this upgrade offer was still **available exclusively through the *Clipper.)*** Send your original *QB* disk, along with this coupon and a check or money order for $15.00 (MC and VISA also accepted). For more information on *Quarterback* and other Central Coast products, see their ad on page 7 of this month's *Ahoy!'s AmigaUser.* (Offer good indefinitely.)

UPGRADE

Computer Repeats

Computer Repeats continues to offer a **20% higher trade-in allowance** to *Ahoy!* Access Club members. Nonmembers must buy hardware from Computer Repeats at the prices listed in the ad on page 55 of the December *Ahoy!* But *your* prices are:

Amiga 500: $199 with trade-in of your C-128 computer, 1571 drive, and 1902 monitor; or, $355 with your C-64 computer, 1541 drive, and 1702.

Commodore 128D: $209 with trade-in of your C-128 and 1571, or 64C computer, 1541 and 1702.

Amiga 2000: $1189 with trade-in of your Amiga 500.

Call 303-939-8144 for a price quote for your particular system. Mention your membership in the *Ahoy!* Access Club. Then, when you ship your equipment for trade-in, include this coupon. (Offer expires December 31.)

20% HIGHER TRADE-IN



P.A.V.Y. is repeating the offer made in October's *Clipper* on *Landmark, The Computer Reference Bible.* (See their ad on page 44 of this month's *Ahoy!)* Their special fall price on the $164.95 package is $129.95. But for *Ahoy!* Access Club members they're going **$10 lower**—to just $119.95 (plus $4.00 postage and handling). And that price, available to our members only, is the **lowest advertised anywhere**. (Offer expires December 31.)

$10 OFF



SOGWAP's *Big Blue Reader* programs allow you to transfer C-64/128 files to MS-DOS format, and vice versa. For full details, see SOGWAP's ad on page 29 of the December *Ahoy!* (or our review in the June '87 *Ahoy!). Ahoy!* Access Club members receive a **20% discount** on the price of both the 128 and 64 versions. The retail price of *Big Blue Reader 128* is $44.95; you pay $35.95. And while the rank and file pay $29.95 for *Big Blue Reader 64,* you pay $23.95. (Offer expires December 31.)

20% OFF

Creative Computers

Again this month, Creative Computers (see pages 10 and 11 of the December *Ahoy!'s AmigaUser)* is offering a discount on their entire line of Amiga products. With every order of $50 or more placed by an *Ahoy!* Access Club member, Creative Computers will extend a **5% discount**, and provide **free shipping** to anywhere in the Continental US. This offer is good on mail orders only; you must include this coupon; only one order per coupon is allowed; and you may not combine this offer with any other Creative Computers discount offer. For more information, call 213-370-2009. (Offer expires December 31.)

5% OFF; FREE SHIPPING

Use Original Coupon Only

Facsimiles will not be accepted



CHIP LEVEL DESIGNS

The *RapiDOS* and *RapiDOS Professional* hardware modification kits let you turn your C-64 and 1541 into a high speed parallel disk operating system. If you've been plodding along at serial speed these many months (we *did tell* you about these products back in our April *Reviews* section), you can't make up for lost time. But if you buy *RapiDOS* or *RapiDOS Professional* now, Chip Level will throw in a **free *Parallel Utilities* disk—a regular $24.95 value!** The disk is essentially the same as Chip Level's *Mass Duplicator 1541* disk (see their ad on page 9 of this month's *Ahoy!),* with the addition of individual file copiers for use with *RapiDOS.* Include $3.00 for shipping with your payment of $49.95 for *RapiDOS* or $99.95 for *RapiDOS Professional.* (Offer expires December 31.)

FREE $25 DISK

Lyco Computer

The FSD-2 Excelerator Plus disk drive is fully compatible with the C-64 or 64C, but offers a number of advantages over Commodore's 1541 and 1541C. The FSD-2 is a half-height drive, smaller and slimmer than the 1541/41C. It features a separate power supply, which allows it to remain cool. It is faster, quieter, and more reliable, and comes with a full one-year warranty. A guide light is available as an option. The price of the drive in Lyco's ad on pages 4 and 5 of the December *Ahoy!* is $149.95. But when *Ahoy!* Access Club members prepay (via check, money order, or credit card), they receive **free shipping**! (Offer expires December 31.)

FREE SHIPPING

SPOC

SPOC's ad on page 39 of this month's *Ahoy!'s AmigaUser* offers their disk of 35 family-oriented game and educational programs, plus a bonus disk containing samples from their library of public domain programs (reworked to run bug-free and without use of the CLI). The SPOCPD collection normally sells for $20.00; but *Ahoy!* Access Club members can obtain the entire collection for only $15.00. (Offer expires December 31.)

$5.00 OFF

☐ Enclosed is my payment of $52.95 ($49.95 plus $3.00 shipping) for *RapiDOS*, or $102.95 ($99.95 plus $3.00 shipping) for *RapiDOS Professional.* Send me your *Parallel Utilities* disk (a $25 retail value) free.

NAME_____

ADDRESS_____

_____

CITY_____STATE____ZIP____

Send coupon to:
Chip Level Designs
Ahoy! Access Club Clipper Offer
P.O. Box 603
Astoria, OR 97103-0603

☐ Enclosed is my prepayment of $149.95 (via check, money order, or credit card) for the FSD-2 Excelerator Plus disk drive, which entitles me to free shipping.

NAME_____

ADDRESS_____

_____

CITY_____STATE____ZIP____

Send coupon to:
Lyco Computer
Ahoy! Access Club Clipper Offer
P.O. Box 5088
Jersey Shore, PA 17740

☐ Enclosed is $15.00. Send me the complete SPOCPD collection (normally sold at $20.00).

NAME_____

ADDRESS_____

_____

CITY_____STATE____ZIP____

Send coupon to:
SPOC
Ahoy! Access Club Clipper Offer
Box 299
Kiowa, OK 74553

☐ Send me *Landmark, The Computer Reference Bible.* Enclosed is my check or money order for $123.95 ($119.95 plus $4.00 postage and handling).

NAME_____

ADDRESS_____

_____

CITY_____STATE____ZIP____

Send coupon to:
P.A.V.Y. Software
Ahoy! Access Club Clipper Offer
P.O. Box 1584
Ballwin, MO 63022

Enclosed is my payment of:
☐ $35.95 for *Big Blue Reader 128* ($20% off the advertised price of $44.95).
☐ $23.95 for *Big Blue Reader 64* ($20% off the advertised price of $29.95).

NAME_____

ADDRESS_____

_____

CITY_____STATE____ZIP____

Send coupon to:
SOGWAP Software
Ahoy! Access Club Clipper Offer
115 Bellmont Road
Decatur, IN 46733

☐ Enclosed is my order totaling $50 or more. I'm taking 5% off the total amount. I understand that I'm also entitled to free shipping to anywhere in the Continental US.

NAME_____

ADDRESS_____

_____

CITY_____STATE____ZIP____

Send coupon to:
Creative Computers
Ahoy! Access Club Clipper Offer
4453 Redondo Beach Blvd.
Lawndale, CA 90260

Look for more bargains in the next edition of the *Clipper*, bound into subscriber copies of the January *Ahoy!* and *Ahoy!'s AmigaUser.*

☐ Send me the *Color Splitter* at 25% off the advertised price of $99.95. Enclosed is my payment of $75.00.

NAME_____

ADDRESS_____

_____

CITY_____STATE____ZIP____

Send coupon to:
SunRize Industries
Ahoy! Access Club Clipper Offer
3801 Old College Road
Bryan, TX 77801

☐ Enclosed is my original *Quarterback* disk, plus my check, money order, or VISA or MC payment for $15.00. Send me the upgraded *Quarterback V. 2.0.*

NAME_____

ADDRESS_____

_____

CITY_____STATE____ZIP____

Send coupon to:
Central Coast Software
Ahoy! Access Club Clipper Offer
268 Bowie Drive
Los Osos, CA 93402

☐ This coupon entitles me to the higher trade-in allowances guaranteed to *Ahoy!* Access Club members.

NAME_____

ADDRESS_____

_____

CITY_____STATE____ZIP____

Send coupon to:
Computer Repeats Inc.
Ahoy! Access Club Clipper Offer
2017 13th Street, #A
Boulder, CO 80302-5201

Ahoy!

CONTENTS

DEPARTMENTS

A View from the Bridge...*of the December issue of* Ahoy! 7

Scuttlebutt...*not even Santa knows about some of these goodies.* 8

Art Gallery...*a winter wonderland of seasonal C-64 graphics.* 22

Flotsam...*readers write in appreciation, and writhe in agony.* 23

Tips Ahoy!...*good programming comes in small packages.* 24

Commodares...*a challenge for chess nuts, a Roman riddle, more.* 27

Reviews...*stuff stockings with some of these recent releases.* 39

Program Listings...*sorry we didn't have time to giftwrap them.* 61

FEATURES

Rupert Report: Adrift in a Sea of Floating Point Numbers 32
Exploring the computer's internal mathematical structure.

*Includes program: *Floating Point Converter* (for the C-64)

PROGRAMS

Tubular! *for the C-64 by Bob Blackmer* 18
Don't go down the tubes—snake your way through them to victory.

Tri Words *for the C-128 by Bob Blackmer* 18
If your favorite game show isn't on TV tonight, try our favorite.

Screen Pocus 64 *Peter M.L. Lottrup* 52
Make screens materialize and dematerialize by machine language magic.

ScreenSaver 64 *by Richard Curcio* 55
Save and recall Commodore text screens for a variety of uses.

Bug Repellents *for the C-64 and C-128 by Buck Childress* 62

Flankspeed *for the C-64 by Gordon F. Wheat* 63

Cover art by James Regan; photography by Christopher Gould and Michael R. Davila

Commodore owners—save on computer software, hardware, and accessories with the *Ahoy!* Access Club! See page 13 for details.

President
Michael Schneider

Publisher
David Allikas

Executive Editor
Michael R. Davila

Art and Production Director
Laura Palmeri

Senior Editor
Richard Curcio

Consulting Editors
Morton Kevelson
Tim Moriarty
Dale Rupert

Entertainment Editor
Arnie Katz

Art Production
Christopher W. Carter

Circulation Director
W. Charles Squires

Production Manager
Mark Kammerer

Director of Promotion
Trisha Clark

Controller
Dan Tunick

Promotion Art Director
Stacy Miller

Controller
Dan Tunick

Advertising Representative
JE Publishers' Representative
6855 Santa Monica Blvd.
Suite 200
Los Angeles, CA 90038
(213) 467-2266
Boston (617) 437-7628
Dallas (214) 660-2253
New York (212) 724-7767
Chicago (312) 445-2489
Denver (303) 595-4331
San Francisco (415) 864-3252

ISSUE NO. 60 DECEMBER 1988

Ahoy! (ISSN #8750-4383) is published monthly except March, May, July, and September by Ion International Inc., 45 W. 34th St., Suite 500, New York, NY 10001. Subscription rate: 8 issues for $16.95, 24 issues for $31.95 (Canada and elsewhere $22.95 and $42.95 respectively). Second class postage paid at New York, NY 10001 and additional mailing offices.

© 1988 by Ion International Inc. All rights reserved. © under Universal International and Pan American Copyright conventions. Reproduction of editorial or pictorial content in any manner is prohibited. No responsibility can be accepted for unsolicited material.

Postmaster, send address changes to *Ahoy!*, 45 W. 34th Street, Suite 500, New York, NY 10001. Direct all address changes or matters concerning your subscription to *Ahoy!*, P.O. Box #341, Mt. Morris, IL 61054 (phone: 815-734-4151). All editorial inquiries and products for review should be sent to *Ahoy!*, 45 W. 34th St., Suite 500, New York, NY 10001.

← Circle #215 on Reader Service Card

Lyco Computer

Marketing & Consultants

Since 1981

Air orders processed within 24 hours.

Lyco Means Total Service.



Mark "Mac" Bowser, Sales Manager

I would personally like to thank all of our past customers for helping to make Lyco Computer one of the largest mail order companies and a leader in the industry. Also, I would like to extend my personal invitation to all computer enthusiasts who have not experienced the services that we provide. Please call our trained sales staff at our toll-free number to inquire about our diverse product line and weekly specials.

First and foremost our philosophy is to keep abreast of the changing market so that we can provide you with not only factory-fresh merchandise but also the newest models offered by the manufacturers at the absolute best possible prices. We offer the widest selection of computer hardware, software and accessories.

Feel free to call Lyco if you want to know more about a particular item. I can't stress enough that our toll-free number is not just for orders. Many companies have a toll-free number for ordering, but if you just want to ask a question about a product, you have to make a toll call. Not at Lyco. Our trained sales staff is knowledgeable about all the products we stock and is happy to answer any questions you may have. We will do our best to make sure that the product you select will fit your application. We also have Saturday hours — one more reason to call us for all your computer needs.

Once you've placed your order with Lyco, we don't forget about you. Our friendly, professional customer service representatives will find answers to your questions about the status of an order, warranties, product availability, or prices.

Lyco Computer stocks a multimillion dollar inventory of factory-fresh merchandise. Chances are we have exactly what you want right in our warehouse. And that means you'll get it fast. In fact, orders are normally shipped within 24 hours. Free shipping on prepaid orders over $50, and there is no deposit required on C.O.D. orders. Air freight or UPS Blue/Red Label shipping is available, too. And all products carry the full manufacturers' warranties.

I can't see why anyone would shop anywhere else. Selection from our huge in-stock inventory, best price, service that can't be beat—we've got it all here at Lyco Computer.

CALL TOLL-FREE: 1-800-233-8760
New PA Wats: 1-800-233-8760
Outside Continental US Call: **1-717-494-1030**

Hours: 9AM to 8PM, Mon. - Thurs.
9AM to 6PM, Friday — 10AM to 6PM, Saturday

For Customer Service, call 1-717-494-1670,
9AM to 5PM, Mon. - Fri.
Or write: Lyco Computer, Inc.
P.O. Box 5088, Jersey Shore, PA 17740

VISA* MasterCard

PLEASE NOTE: • full manufacturers' warranties • no sales tax outside PA • prices show 4% cash discount; add 4% for credit cards • APO, FPO, international: add $5 plus 3% for priority • 4-week clearance on personal checks • we check for credit card theft • sorry, compatibility not guaranteed • return authorization required • due to new product guarantee, return restrictions apply • price/availability subject to change • prepaid orders under $50 in Continental US, add $3.00

COMMODORE

Access:
Echelon $25.95
Mach 128 ..... $28.95
Wld. Cl. Leader Brd. ... $22.95
Famous Courses 1 or 2 ..... $11.95

Action Soft:
Up Periscope $18.95
Thunderchopper $18.95

Activision:
Last Ninja $19.95
Might & Magic $22.95
Crossbow $19.95
Maniac Mansion $19.95
Beyond Zork $25.95

Batteries Included:
Paperclip III $31.95

Berkeley Softworks:
Geofile 64 ..... $29.95
Geos 64 ..... $35.95
Geos 128 ..... $39.95
Geowrite 128 ..... $39.95
Berkeley TriPak $29.95

Broderbund:
Bank St. Writer $29.95
Print Shop $26.95
Print Shop Compan. $20.95
Graphic Library 1,2,3 .. $14.95
Cauldron $9.95

Electronic Arts:
Bard's Tale III $25.95
Hunt for Red October .. $25.95
Monopoly $20.95
Strike Fleet $20.95
Wasteland $25.95

Epyx:
Fastload $22.95
California Games $22.95
4x4 Off Road Racing .. $22.95
Metrocross $13.95

COMMODORE

Firebird:
Jinxter $19.95
Starglider $11.95

Microleague:
Microleag. Baseball $22.95
Microleag. Wrestling $16.95

Microprose:
Airborne Ranger $22.95
Gunship $19.95
F-15 Strike Eagle $19.95
Pirates $22.95
Stealth Fighter $22.95

Mindscape:
Blockbuster $16.95
Harrier Combat Simulator $16.95
Paperboy $19.95
Road Runner $19.95

Origin:
Autoduel $29.95
Ultima IV $34.95

Software Simulations:
College Basketball $22.95
Football $17.95

Springboard:
Newsroom $19.95
Certificate Maker $14.95

Strategic Simulations:
Phantasie III $25.95
Eternal Dagger $25.95
Questron II $25.95

Sublogic:
Flight Simulator II $30.95
Stealth Mission $30.95

Timeworks:
Swiftcalc 128 ..... $27.95
Wordwriter 3 ..... $22.95

Unison World:
Art Gallery 1 or 2 ..... $14.95
Print Master $17.95

AMIGA

Activision:
Fairy Tale Adventure ... $27.95
Romantic Encounters .. $22.95

Electronic Arts:
FA/18 Interceptor $33.95
Ferrari Formula One ... $33.95
World Tour Golf $24.95

Epyx:
Destroyer $22.95
Death Sword $11.95
Sub Battle Simulator ... $27.95

Microprose:
Silent Service $22.95

Mindscape:
Balance of Power $27.95
Harrier Combat Simulator $27.95

Origin:
Moebius $34.95
Ogre $18.95

Strategic Simulations:
Gettysburg $35.95
Kampfgruppe $35.95
Phantasie III $25.95

Sublogic:
Flight Simulator $31.49
Jet Simulator $31.49
Scenery Disk ..... $CALL

Unison World:
Print Master $25.95
Art Gallery 1 or 2 ..... $14.95
Fonts & Borders $17.95

DEALER INQUIRIES WELCOME, CALL TOLL FREE

MONITORS

Magnavox:
BM7652 ..... $79.95
BM7622 ..... $79.95
7BM-613 ..... $79.95
7BM-623 ..... $79.95
CM8502 ..... $179.95
9CM-053 ..... $339.95
CM8762 ..... $239.95
8CM-515 ..... $CALL
8CM-873 ..... $CALL
9CM-082 ..... $439.95

Thomson:
4120 CGA $219.95*
GB 100 ..... $119.95*
GB 200 Super Card . $169.95*
**quantities limited*

Blue Chip:
BCM 12" Green TTL ... $54.95*
BCM 12" Amber TTL ... $69.95

MODEMS

Avatex:
1200e $65.95
1200i PC Card $65.95
1200p $89.95
1200hc Modem $89.95
2400 ..... $149.95
2400i PC Card $139.95

US Robotics:
Courier 1200 ..... $169.95
Courier 2400 ..... $299.95

1-800-233-8760

star MICRONICS

NX1000



*w/cable purchase

- 144 Cps Draft
- 36 Cps NLQ
- EZ Soft Touch Selection
- Paper Parking

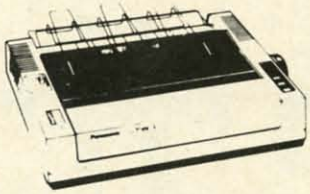
$169.95

NX-1000	$169.95*
NX-1000C	$169.95
NX-1000 Color	$225.95
NX-1000C Color	$229.95
NX-15	$289.95
NR-10	$319.95
NR-15	$419.95
NB-15 24 Pin	$669.95
NX-2400	$309.95
NB24-10 24 Pin	$369.95

*w/cable purchase

Panasonic Office Automation OA

1080i Model II



- 150 Cps Draft
- Friction & Tractor Feed Std.
- Bidirectional & Logic Seeking
- NLQ in all Pitches

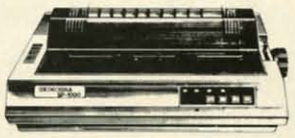
$149.95

3151	$CALL
KXP 4450 Laser	$1649.95
1524 24 Pin	$559.95
Fax Partner	$579.95
Optical Scanner	$859.95
1080i Model II	$149.95*
1091i Model II	$179.95
1092i	$309.95
1592	$375.95
1595	$439.95

*quantities limited

SEIKOSHA

Sp180Ai



- 100 Cps Draft
- 24 Cps NLQ
- Tractor & Friction Feed
- Epson FX & IBM Graphic Compatible

$125.95*

*quantities limited

SP 180Ai	$125.95*
SP 180VC	$125.95*
SP 1000VC	$139.95
SP 1000AP	$159.95
SP 1200VC	$149.95
SP 1200Ai	$159.95
SP 1200AS RS232	$179.95
SK3000 Ai	$349.95
SK3005 Ai	$445.95
SPB 10	$CALL
SL 130Ai	$599.95
SP 1600Ai	$CALL

PRINTERS

Okidata

Okimate 20	$129.95
Okimate 20 w/cart	$189.95
120	$189.95
180	$219.95
182	$209.95
182+	$225.95
183	$239.95
292 w/interface	$449.95
293 w/interface	$585.95
294 w/interface	$799.95
393	$955.95
Laser 6	$CALL
390	$479.95
391	$649.95
320	$345.95
321	$475.95

Toshiba

321SL	$489.95
341 SL	$659.95
351 SX 400 cps	$979.95

Epson

LX800	$184.95
FX850	$339.95
FX1050	$499.95
EX800	$434.95
LQ500	$339.95
GQ3500	$LOW
LQ850	$525.95
LQ1050	$749.95

Brother

M1109	$189.95
M1509	$335.95
M1709	$439.95
Twinwriter 6 Dot & Daisy	$899.95
M1724L	$569.95
HR20	$345.95
HR40	$599.95
HR60	$649.95

Citizen

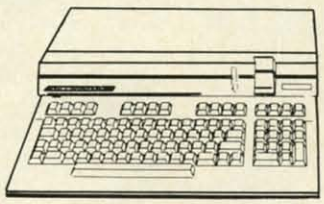
120 D	$144.95
180 D	$159.95
MSP-40	$279.95
MSP-15E	$309.95
MSP-50	$369.95
MSP-45	$349.95
MSP-55	$469.95
Premiere 35	$539.95
Tribute 224	$539.95

COMMODORE

$439.95 128 D System

Commodore 128D and Thompson 4120

$629.95



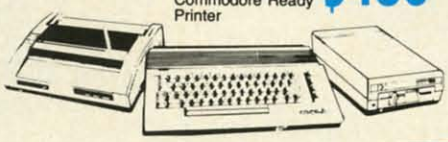
COMMODORE HARDWARE

64C Computer	$149.95
C128D Computer/Drive	$439.95
1541 II Disk Drive	$179.95
1581 Disk Drive	$189.95
Excel FSD-2+ C64 Drive	$149.95
1802C Monitor	$179.95
1084 Monitor	$279.95
C1351 Mouse	$39.95
1764 RAM C64	$117.95
Colt PC	$679.95

COMMODORE 64C Special System

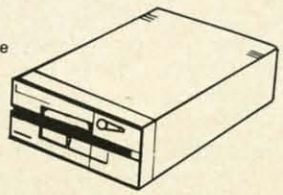
- Commodore 64C Computer
- Excel FSD-2 Disk Drive
- Star NX1000C Commodore Ready Printer

$459.95



Excel FSD-2+ Disk Drive

100% Commodore 64C drive compatible, this Excelerator Plus disk drive is quieter, smarter, faster, and more reliable than the 1541 and 1541C.



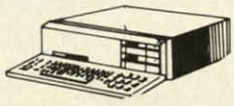
$149.95



Educational Institutions:

If you are not currently using our educational service program, please call our representatives for details.

COMMODORE COLT PC



- IBM PC Compatible
- 640K Std.
- Two 5¼ Drives Std.
- Expansion for Hard Drive
- Turbo Processor
- MSDOS + GW Basic Included
- Serial + Parallel Ports
- Mono/RGB Color Card Included

$679.95

Evolution (ev´ e-lo͞o´ shen) n. The process of growing or developing to a higher state.

INTRODUCING THE NEXT STEP IN CARTRIDGE EVOLUTION!

It started with...
SUPER SNAPSHOT V2

"...probably the most advanced on the market..."
Morton Kevelson, Ahoy! Nov '87

"...useful...fun...exceptional quality..."
David Martin, RUN Dec '87

"All in all, I think this is the best of the bunch." *Tim Sickbert, INFO Jan '88*

followed by...
SUPER SNAPSHOT V3

"Snapshot + Slideshow = a dynamic duo!" *Sue Albert, INFO May/June '88*

"...one of the most technically advanced...packed with useful features..."
Art Hunkins, Gazette June '88

"...my personal favorite is Super Snapshot."
Morton Kevelson, RUN Sept '88

"Hats off to LMS Technologies. They make a good product."
John Christensen, Input

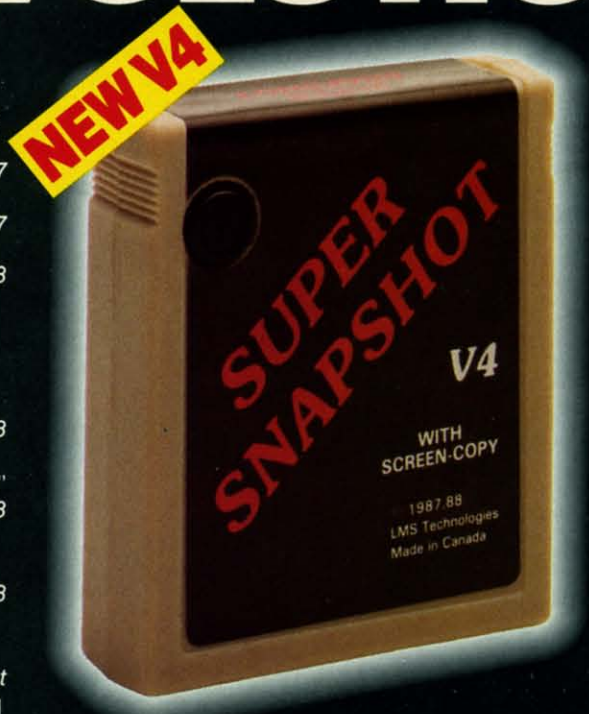
"The monitor that made me give up all the others."
Lawrence Hiler, Chip Level Designs (formerly of Basement Boys Software)

"...indispensable, can't live without it."
Bob Mills, programmer of Renegade

...and now we bring you
SUPER SNAPSHOT V4

With even MORE of the power-packed utilities you've come to expect from the makers of the most popular utility cartridge in North America!
Available **Nov. '88**
Super Snapshot is used by INFO in producing their magazine.

▸ Version 1, 2, and 3 owners may upgrade to version 4 for $20.00 CALL US! ▸ C128 disable switch, add $8.00 ▸ 10-day, money back guarantee.



ALSO AVAILABLE: SUPER SNAPSHOT SLIDESHOW CREATOR

Powerful options within this package allow you to create slideshows using Snapshotted screens to produce dazzling effects in eye-catching presentations. Options include: displays that can fade in/out, shutter on/off, pop on/off, or slide on/off. Use any of 10 different fonts to display your personalized, scrolling message -ANYWHERE ON THE SCREEN! Slideshow can even be incorporated into your BASIC and ML programs.

"Slideshow and Snapshot are a power partnership."
Sue Albert, INFO May/June '88

"...a gem of a companion: Slideshow Creator... well-designed..."
Art Hunkins, Compute!'s Gazette June '88

Super Snapshot V4 - $64.95
Super Snapshot Slideshow Creator - only $14.95

EVOLUTION OF FEATURES

▸ Works with all 64(C), 128(D), 1541(C), 1571, 1581 ▸ Totally transparent when disabled ▸ Turbo load and save (1541, 1571, 1581): 15x faster loading, 7x faster saving; 25x faster loading with TURBO*25 ▸ Super DOS wedge: all standard commands PLUS extras. Supports devices 8, 9, 10, and 11 ▸ Function keys: pre-programmed and re-programmable **(now 13 f-keys)** ▸ Archiver: saves all memory-resident programs to disk as 1 or 2 autobooting files ▸ Screen Copy: dump to disk in popular graphic program formats or to printer in 3 sizes **(print sprites, more printers supported).** Dumps BOTH multi-colour and hi-res screens (STILL the only utility cartridge of it's kind to do both!) ▸ M/L monitor: DOES NOT CORRUPT MEMORY! Interrupt, examine, modify, and resume a running program. All standard commands PLUS bank-switching, bi-directional scrolling, IO command, track and sector editor, **ASCII hunt, and drive monitor** ▸ Sprite disable and extended life feature. **Now includes sprite re-enable (unique to SS V4)** ▸ **Sprite monitor and full-featured sprite editor** ▸ Fast disk copier: 1 or 2 drives; supports 1541, 1571, and 1581 ▸ **Basic Aids: append, auto, autodata, menu, merge, old, pron, proff, tron, troff, renum** ▸ **File Management System: fast file copier (1541, 1571, 1581 -including partitions, 1 or 2 drives, any combination); scratch, rename, PLUS expert mode** ▸ Free Kracker Jax 100+ parameter disk including nibbler (for those tough back-ups).

SOFTWARE SUPPORT INTERNATIONAL

DEALER INQUIRIES WELCOME

VISA · MC · DISCOVER

ORDERING: we accept money orders, certified checks, personal checks of previous SSI customers, VISA, MC, DISCOVER and COD. Orders shipped to USA, FPO, APO or Mexico please add $3. COD (available to US customers only) add $2.25 per order. Foreign add $7.50 per cartridge for shipping. Defective items replaced at no charge if accompanied by return authorization number. All in-stock orders are processed within 24 hours. WA residents add 7.5% for sales tax. Mail your order to Software Support Int.-D13, 2700 NE Andresen Rd., Vancouver WA 98661.

LMS TECHNOLOGIES

In Canada order from: Marshview Software, PO Box 1212, Sackville NB E0A 3C0 (506) 536-1809 SS V4 $69.95 Slideshow Creator $19.95

Or call our toll-free order line at 1-800-356-1179, 9am-5pm Pacific time, Monday-Friday. After hour orders accepted at (206) 695-9648 7 days a week. Technical support available. Call (206) 695-9648, 9am-5pm Pacific time, Monday-Friday.

VIEW FROM THE BRIDGE

This month it begins—the most exhaustive game software coverage you'll find in any 64/128 magazine, at any price! Entertainment Editor Arnie Katz and his staff have profiled no fewer than eight new entertainment packages for this issue—and just in time for Christmas shopping, too!

As we stressed last month, our expanded entertainment coverage is only a reflection of the scarcity of non-entertainment software on the market—not a sign of the "teching down" of *Ahoy!* We'll continue to tailor the magazine for the intermediate to advanced users who have always made up the bulk of our readership.

But the proof of the pudding is in the reading—of the December issue of *Ahoy!:*

• The odds are at least 1.70141183E+38 to 1 that you're annoyed by those strange numerical representations your computer resorts to when figures become too unwieldy to list. This month Dale Rupert explains why these types of numbers have a place in BASIC, along with offering a great deal more information. Once you've finished this issue's *Rupert Report,* you'll never again feel like you're *Adrift in a Sea of Floating Point Numbers.* (Turn to page 32.)

• For fans of Bob Blackmer's games, Christmas comes twice this month: both on the regularly scheduled date (December 7, isn't it?), and on receipt of this issue of *Ahoy!,* containing two Blackmer blockbusters. *Tri Words* is an electronic jumble contest for the C-128 which, the aforementioned author assures us, uses every three-letter word in his dictionary, excluding abbreviations and slang. (Turn to page 18.) *Tubular!* poses the problem of scaling a network of high pressure tubing to reach the top of a pyramid, scooping up 14 bells along the way. Bob himself has been unable to complete the 16th and highest level of the game. If anyone out there does (and we're sure someone out there will), let us hear from you—Bob is dying to know what happens! (Turn to page 18.)

• Just like us, you've probably wondered—how did Peter M.L. Lottrup come by those middle initials? Did he tack them on after he became a programmer? Did his parents make a lucky guess as to his future occupation? Or do they simply stand for something like Melvin Louis, rather than what we all feel they must? Unfortunately, we've had no opportunity to find out, since Peter sends his programs in from Buenos Aires, Argentina. One day, though, we'll spring for the long distance call to find out. In the meantime, there's no mystery about his *Screen Pocus 64* in this issue—its ability to fade text screens in and out is clearly of great value to programmers. (Turn to page 52.)

• Richard Curcio's innovative utilities have appeared in most of the leading Commodore periodicals. But now that he's joined our staff as Senior Editor, you can expect all his best work to appear in these pages. This month Rich offers a variation on one of his best. *Screensaver* provides C-64 users with pseudo-window capabilities approximating the real window capabilities of *TextSave* for the C-128 (January '88 *Ahoy!).* (Turn to page 55.)

• Members of the *Ahoy!* Access Club (consisting of subscribers to *Ahoy!* and *Ahoy!'s AmigaUser)* can take advantage of money saving offers from companies like Software Support, Lyco,Chip Level, SOGWAP, P.A.V.Y., Dune, and many others in this month's edition of the *Clipper.* The special monthly supplement is bound into subscription copies only. So if you haven't yet taken advantage of our discount subscription rates (see page 25), you now get to kick yourself harder than ever before!

We hope this issue of *Ahoy!* gives you nothing to kick about. If it does, we're only a letter or a phone call away.

—David Allikas

SAVE WITH THE Ahoy!

DISK MAGAZINE

Save even more on top of the already money-saving subscription rates for *Ahoy!* and the *Ahoy!* program disk!

If you subscribe to the *Ahoy! Disk Magazine*—magazine and disk packaged together—you'll receive the two at substantial savings over the individual subscription prices!

YEARLY SINGLE ISSUE PRICE (8 ISSUES)		SEPARATE SUBSCRIPTION PRICE (8 ISSUES)	
Magazine:	$23.60	Magazine:	$16.95
Disk:	$71.60	Disk:	$52.95
TOTAL:	$95.20	TOTAL:	$69.90

AHOY! DISK MAGAZINE 8 ISSUES $65

Use the postpaid card bound between pages 50 and 51 of this magazine to subscribe. (Canadian and foreign prices are higher.)

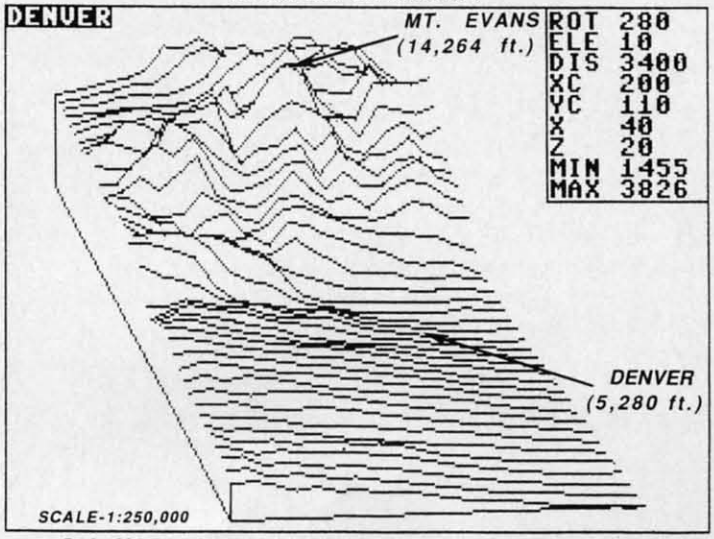
The *Ahoy! Disk Magazine* is also available at most newsstands, as well as Waldenbooks, B. Dalton's, and other fine software outlets.

SCUTTLEBUTT

CPU REPLACEMENT • COMPOSITION PROGRAM • PHONICS TUTOR • SWEEPSTAKES • TRAVEL PROGRAM • VIRUS HELP • GRAPHICS SHOW • BBS LEGAL PRIMER • C-64 FORTRAN • GEOGRAPHY PROGRAM • GAMES FROM ACCESS, DISCOVERY, ACCOLADE • 3-D GLASSES

ACTUAL DIGITAL LANDSCAPE PRINTOUT

ITALICS NOT ON HARDCOPY



518 MAPS COVER THE ENTIRE CONTERMINOUS U.S.

An area to be viewed on **Digital Landscape** *is loaded from one of five Elevation Disk sets, containing 414,000 elevations taken at regular intervals across the country.*

BBS LAW

SYSLAW: A Legal Guide for Sysops explains the legal rights and risks of bulletin board operators. The 100-page volume discusses the consequences of someone's posting copyrighted material on your board, your barring someone from using your BBS, the ramifications of charging users or accepting ads, and more. The book's authors are two attorneys with a knowledge of the subject: Jonathan Wallace is Assistant Sysop of CompuServe's Law Forum, Rees Morrison is a sysop on the American Bar Association's BBS, and together they run Lawyers Linked by Modem, a BBS for law-related material (212-766-3788). Price of the book is $19.00 plus $2.00 postage.

LLM Press, 212-766-3785 (see address list, page 14).

Circle #180 on Reader Service Card

FORTRAN TRAINING

With support for more than 45 statements and functions, *Fortran 64* ($39.95) offers an economical way to learn the language on the C-64. The built-in editor, compiler, and linker lets you create a fast stand-alone program which, when completed, can be run without Fortran. Subroutines and functions can be compiled separately from the main program, and input and output routines may be freeform or formatted. The user has access to the 6502 registers, Kernal, and machine language routines.

Abacus Software, 616-698-0330 (see address list, page 14).

Circle #181 on Reader Service Card

US IN 3-D

Digital Landscape lets the C-64 user view the topography of any area of the Continental US in 3-D. An area to be viewed is loaded from one of five separately available Elevation Disk sets, containing 414,000 elevations taken at regular intervals across the US.

Data taken from the Elevation Disks or entered through the keyboard can be used to produce 3-D renderings and horizontal or vertical cross-sections on the screen, with pertinent information displayed. Drawings can be rotated 360 degrees in one degree increments in azimuth and tilted from +1 degree to +89 degrees in declination. The scale of 3-D drawings can be varied, and vertical cross sections expanded and contracted vertically or horizontally.

The price of the *Digital Landscape* program disk, available in 5¼" or 3½" (1581) format, is $46.95. Each Elevation Disk set consists of two or three 5¼" disks and costs $29.95. All five sets can be purchased together for $99.95, or on three 3½" disks for $27.95 each.

Digiscape Software, 214-241-9891 (see address list, page 14).

Circle #182 on Reader Service Card

$100 IN FREE TIME

The Online Information Network (formerly the Instant Yellow Page Service) will give *Ahoy!* readers $100 in free usage if they mention *Ahoy!* The network makes it possible to compile custom mailing lists via dial-up access to three major databases consisting of 13 million business listings, 462,000 US manufacturers, and 3.9 million high-income customers. Charges are $1.00 per minute connect time plus 12¢ per record printed or displayed, as well as a $95 subscription fee for the first year (second year, $60).

Online Information Network, 402-593-4593 (see address list, page 14).

Circle #202 on Reader Service Card

SAT STUDY GUIDE

Simon & Schuster's Computer Study Guide for the SAT ($29.95) provides C-64 scholars with 25 practice modules of over 500 questions covering all the required areas of the Scholastic Aptitude Test, and two simulated exams. Included are a built-in optional timer, an automatic scoring device, a catalog of explanations for every question, an

CHIP LEVEL DESIGNS PRESENTS

128 mode & CP/M version now available!

-RapiDOS-

THE SUPER-FAST PARALLEL DISK OPERATING SYSTEM FOR THE COMMODORE 64 AND 1541 DISK DRIVE!

- **All** disk access is handled at super-fast parallel speed! (LOAD, SAVE, directory, SEQ & REL files, scratch, validate, format).
- Designed to support multiple drive systems.
- Parallel Centronics printer support with file spooling capability.
- Many useful, timesaving features (DOS Wedge, screen dump, resident monitor).
- No loss of compatibility.
- Far too many features to list in this ad . . . and perhaps in this magazine! (Call or write to get all the details!)

. . . and if you want the ultimate, get RapiDOS Professional!

- Gives even faster disk access!
- Uses 8k RAM track buffering and hardware GCR conversion!
- Provides 40 track extension (749 blocks free!)
- Adds 20 new disk commands (i.e., lock files, change disk name).

Here's what people are saying about RapiDOS:

Mike J. Henry (Basement Boys Software) - *"It's amazing how incredibly fast it is, I'm impressed!"*
Mitch S. (Eaglesoft Inc.) - *"Very fast, very reliable, and very compatible. I love it!"*
J.F. Jones (ADP) - *"Superbases' speed is increased greatly, and it's now a dream to use!"*

Function	Normal DOS	RapiDOS	RapiDOS Pro	Your System
Load 202 blocks	128 sec.	15 sec.	3 sec.	
Save 202 blocks	196 sec.	98 sec.	8 sec.	
Format 35 tracks	90 sec.	24 sec.	18 sec.	

Compare these speeds with your current system and see why RapiDOS puts the C-64 into a different league!

RapiDOS requires a socketed kernal ROM U4, and is available in versions for the 64c, 128 in 64 mode, and 1541c (please specify when ordering). RapiDOS is easily upgradeable to the Professional Version. RapiDOS Professional drive controller is **(c) '87 mts data GbR,** the creators of the best European parallel systems.

At these affordable prices no C-64 owner should be without RapiDOS!

RapiDOS $49.95 **RapiDOS Professional $99.95**

MASS DUPLICATOR 1541

- For the C64/128 with a single 1541 disk drive.
- 15 second, 4 pass backup for standard disks!
- 25 second full GCR Super Nibbler, the most powerful yet!
- 9 second disk format!
- Fast loader!
- Quick installation. **$32.95**
- Can be upgraded to RapiDOS

MASS DUPLICATOR MSD

- A must for any MSD SD-2 owner.
- 15 second standard disk backup!
- 18 second full GCR Quick Nibbler!
- 9 second disk format! **$25.95**

MSD AUTO COPY ROM

- Adds new Fast Backup commands!
- Turns the MSD SD-2 into a dedicated copying drive (no computer needed). **$29.95**

C-64 BURST-ROM

- Gives the 64 'Burst Mode' when used with a 1571 or 1581 disk drive!
- Loads 100 blocks in 6 seconds on a 1571, 4 seconds on a 1581!
- Fast directory, SEQ, and REL file access!
- Built in DOS wedge!
- Simple installation. (Kernal ROM U4 must be socketed) **$39.95**

C-128 BURST-ROM

- Lets the 128 run at 'Burst' speed when in 64 mode!
- Provides the same features as the C-64 Burst-ROM! **$49.95**

STILL TO COME

- MSD SD-1 Fast Copier!
- 1571 Mass Duplicator!
- 1581 Utility Pack!

TURBO 64

- Speed-up cartridge for the C-64, just plug it in!
- Adjust the clock rate from 100 khz (1/10 normal) to 4 mhz (4x normal)!
- Uses 8/16 bit 65816 microprocessor (same as the Apple][gs... but twice as fast)!
- Spread sheets, BASIC, flight sims, graphics, and now GEOS... all are accelerated! **$199.95**



CHIP LEVEL DESIGNS

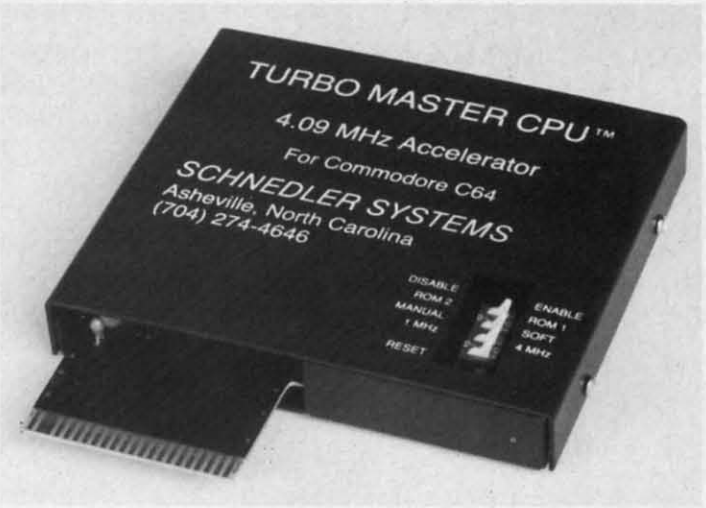
Cash, Check, Money Order, M.C. or Visa

$3.00 shipping on all orders
C.O.D.'s add $3.00

P.O. BOX 603
ASTORIA, OR 97103-0603

(503) 861-1622

Dealer, Distributor, & Group Pricing Available



The Turbo Master CPU Processor Accelerator increases the C-64's processing speed by four times. Also included are Turbo disk routines in ROM.

online scratch pad for computations, and test-taking strategies. An online calculator "locks out" during the two tests. Bar graphs display improvement charts and projected scores. A "random start" feature allows the second-time test taker to skip over the basics and brush up on more difficult areas of study (trigonometry, reading comprehension, etc.). A review of high school grammar is included for the Test of Standard Written English.

Simon & Schuster Software, 212-373-8882 (see address list, page 14).

Circle #201 on Reader Service Card

GRATIS GRAPHICS

While supplies last, Broderbund is including a *Special Edition Graphics Library* disk with specially marked packages of *The Print Shop.* The disk, not available as a stand-alone product, includes over 100 graphics, borders, and full panel designs that can be used to supplement those included in the main program.

Broderbund Software, 415-492-3200 (see address list, page 14).

Circle #205 on Reader Service Card

TRADE-IN EXTENSION

Commodore has extended until December 31 the trade-in program that allows owners of any Commodore computer to receive a $100 credit toward the purchase of an Amiga 500 or 2000. Further information can be obtained at any Commodore dealer, or direct from Commodore.

Commodore Business Machines, 800-343-3000 or 215-431-9100 (see address list, page 14).

Circle #206 on Reader Service Card

MUSIC WRITER

The MAESTRO!, a menu-driven composition program, lets users select notes by placing the cursor at the proper position on the musical staff, and duration by moving the cursor up and down a column offering durations from 32nd notes upward, including triplets, dotted notes, double dotted notes, grace notes, tied notes, and non-standard durations. The SID chip's entire eight octaves are supported, and up to 1023 notes are permitted for each of its voices. Other capabilities include changing the ASDR envelope, making keyboard and programmed changes in tempo and volume, silencing one or more voices so the user can learn an individual vocal part, transposing to other keys, and cut and paste. Due to memory restrictions, the program does not include fancy graphics, printout capability, or support for SID filters, resonance, and Ring Modulation. Price is $24.95 plus $3.00 shipping (CA residents add sales tax).

Zwetzig Associates, 415-339-9396 (see address list, page 14).

Circle #184 on Reader Service Card

REPLACEMENT CPU

The Turbo Master CPU Processor Accelerator, an onboard replacement microprocessor, plugs into the C-64's expansion port to provide the computer with four times faster processing speed. Also included are turbo disk routines in ROM for five times faster disk load and save, and a DOS wedge in ROM. Unlike other products which speed up only the disk drive, Turbo Master accelerates screen graphics, word processor functions (scroll, search and replace, insert), number crunching, and spreadsheet recalculation. The $179 price includes shipping to US addresses, and a 10-day money back guarantee.

Schnedler Systems, 704-274-4646 (see address list, page 14).

Circle #185 on Reader Service Card

VIRUS RX

Computer Viruses—A High-Tech Disease explains viruses (to which autobooting computers like the C-128 are particularly susceptible), their history, how they work, and what can be done to protect against them. Several rudimentary programs demonstrate some of the ways viruses can infect your computer. 288 pages; $18.95.

Abacus, 616-698-0330 (see address list, page 14).

Circle #189 on Reader Service Card

GRAPHICS SHOW

The 5th Annual Computer Graphics New York Show, to be held January 17-19 in the Jacob K. Javits Convention Center, will showcase graphics hardware, software, and services. Sessions will address desktop publishing, corporate video/animation, business and corporate graphics, and CAD. Admission is free to those who preregister.

Exhibition Marketing & Management Co. Inc., 703-893-4545 (see address list, page 14).

Circle #190 on Reader Service Card

25¢ SAVED

Commodore has saved 25¢ by neglecting to inform us at *Ahoy!* that production of the original Commodore 128 model has ceased. It was dropped in favor of the 128D (with detachable keyboard and built-in disk drive). We had to learn of the change from the September issue of Commodore's own magazine, just as some of you may have. We mention it here primarily so that you'll know why we didn't tell you sooner.

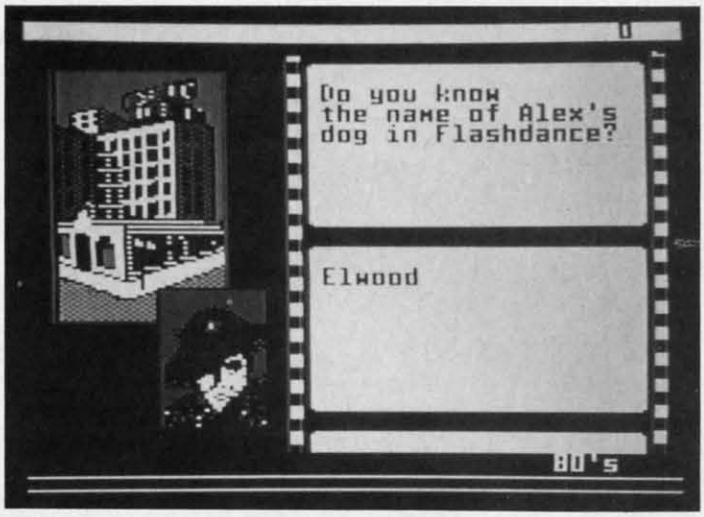
We'd be interested in knowing what Commodore will do with the 25¢ they saved. What did they determine to be a better value for their money than the good media relations a timely press release could have fostered? We don't know of any use they could find for 25¢ that would be worth nearly as much as that. About the only thing we could think of that even comes close would

be a letter to our readers, apologizing for their negligence. But it's unlikely that the money will be invested that way, since we've received no such letter on the many occasions in the past when the same sort of thing happened.

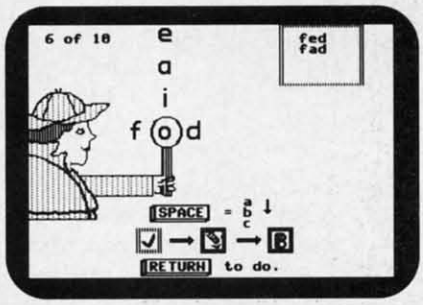
Perhaps Commodore is going to hold on to the 25¢, just in case their fourth quarter turns out to be less profitable than expected. That way, if dividends are disappointing, they can divide the 25¢ among their stockholders. If you're in that category, check your year-end statement for your share of those two bits.

Commodore International, 215-431-9100 (see address list, page 14).

Circle #188 on Reader Service Card



Why waste money on acting lessons when your* Ticket to Hollywood *is waiting? Eight decades of movie history and thousands of facts are covered.



Basic phonics skills for youngsters.

PHONICS TUTOR

Clue In on Phonics uses a Sherlock Holmes theme to reinforce basic phonics skills, including identifying single consonant sounds and short vowel sounds and making word families. Kindergarteners to fourth graders use a magnifying glass to identify blends and digraphs in words, or add blends and digraphs to various letter patterns to make words. In the lesson on vowels, students compare and match the sounds of vowel digraphs and diphthongs. They also identify words which become new words when the silent E is added.

Teachers can set the number of questions in a lesson, turn the sound on or off, decide what percent must be scored to play the reward game, and turn the reward on or off. Names and scores for up to 200 students can be stored alphabetically on disk. Available on the C-64 on either 5¼" or 3½" disk —$44.95 for one disk, $54.95 with backup, and $164.95 for class pack.

Gamco Industries, 800-351-1404 or 915-267-6327 (see address list, page 14).

Circle #183 on Reader Service Card

STAR 64

Who was born Maurice Micklewhite? What superstar made her escort follow two paces behind her? How many movies did Tracy and Hepburn make? You'll try to solve one of 25 mysteries by answering these and other questions in *Ticket to Hollywood* ($29.95), Blue Lion's latest C-64 travelogue. You'll cover eight decades of movie history and thousands of facts, from the silent screen to the present, as you explore landmarks and follow the footsteps of the stars with the aid of six 3-D maps.

Blue Lion Software, 617-876-2500 (see address list, page 14).

Circle #186 on Reader Service Card

SWEEPSTAKES

Epyx is promoting their products with three simultaneous contests:

The Print Magic Sweepstakes offers more than 100 prizes, with a grand prize of two three-night stays at the Hyatt Grand Champions Resort near Palm Springs, CA, plus airfare. Other prizes include CD players, road bikes, sampling keyboards, and memory telephones. You can enter by filling out an entry blank found at any Babbages, Egghead Discount Software, Electronic Boutique, Software Etc., or Wherehouse store. Entries must be returned by January 31, 1989.

The Gold Rush Sweepstakes offers a chance at a grand prize of a vacation for four to Los Angeles plus $1300 for hotel and expenses, a first prize of round-trip tickets for two to LA, and 500 second prizes of U.S. Gold game posters. To enter, fill out the form inside packages of *Tower Toppler* and *Technocop* and return it by May 31, 1989.

In the Dive Bomber Sweepstakes, you can win one of 15 Avirex leather WWII type G-1 Navy flight jackets, or one of 80 Avirex silk classic aviator scarves. Fill out and return the card inside specially marked *Dive Bomber* boxes by May 31, 1989.

Epyx, Inc., 415-368-3200 (see address list, page 14).

Circle #187 on Reader Service Card

3-D GLASSES

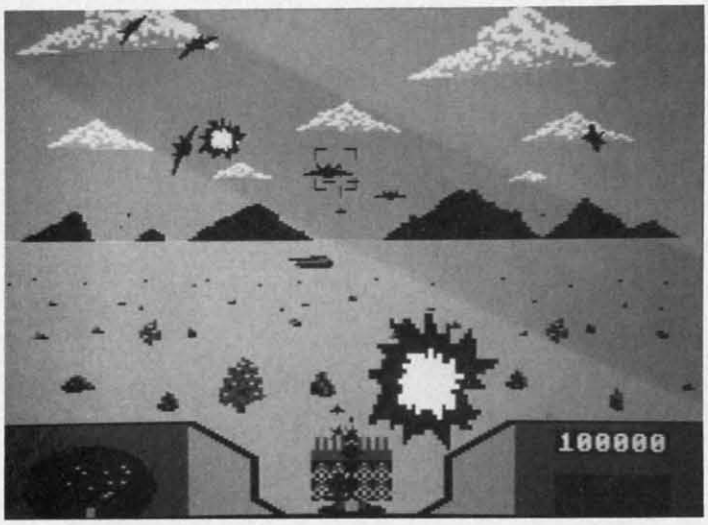
Shades of Elvis, poodle skirts, and Joe McCarthy—when used with specially designed software, Haitex's X-Specs 3D (sic) glasses create the illusion of a 3-D image. The glasses, scheduled for release in a C-64 compatible version at some unspecified point in the future (they've just been released for the Amiga), control what each eye sees independently by closing and opening an optical shutter at 60 frames per second. Price will probably be in the $99.00 range.

Haitex Resources, 214-241-8030 (see address list, page 14.)

Circle #194 on Reader Service Card

SUPERBASE SHIFT

Precision Software of London, England has taken over the North American distribution of *Superbase Personal* and *Superbase Professional* from Progressive Peripherals & Software, establishing a US office in Denver to do so. Precision will also take over the servicing and technical support of the products.



Heavy Metal— ***Modern Land Combat Volume I lets you command modern weapons systems—a battle tank, an anti tank system, or a fast attack vehicle.***

Precision Incorporated, 214-929-4888 (see address list, page 14).
Circle #195 on Reader Service Card

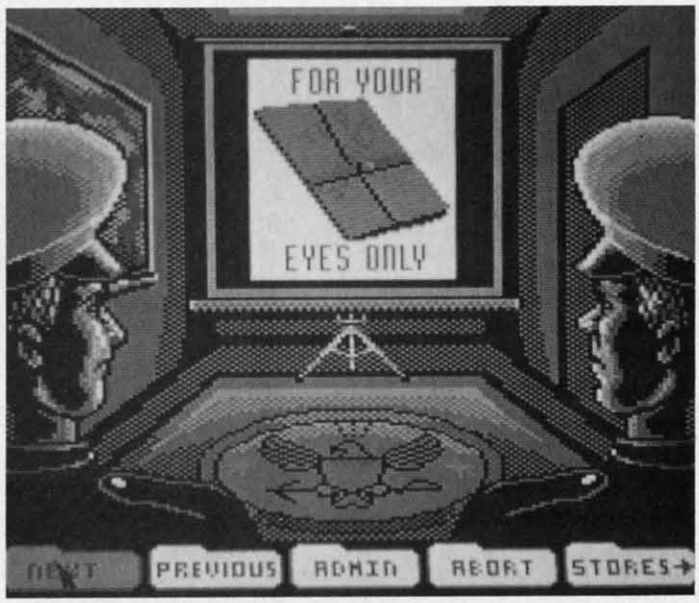
GAMES

Heavy Metal—Modern Land Combat Volume I ($39.95) combines elements of simulation, arcade action, and strategy as you advance through the ranks of today's army. You start in the war as a Second Lieutenant, devising strategies to overrun enemy positions. Once the strategy is set you move to the front line, commanding one of three modern weapons systems: the M1A1 Abrams (the US Army's newest, most sophisticated battle tank), the Martin Marietta Air Defense Anti Tank System, aka ADATS (located at your forward supply stations to defend against air and ground attack), and the XR311 Fast Attack Vehicle, or FAV (based on the actual US Army vehicle used to attack outlying enemy stations).

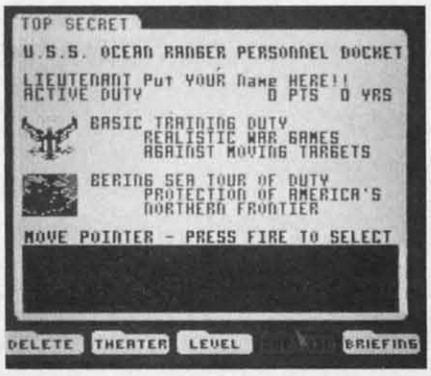
Access Software, 801-298-9077 (see address list, page 14).
Circle #191 on Reader Service Card

Ocean Ranger ($34.95) simulates the operation of a next-generation missile ship. Battling in four of the world's military hot spots (the Bering Sea, Southeast Asia, Central America, and the Persian Gulf), you pilot your craft through a non-stop firestorm while destroying primary and secondary targets. Missions entail battling destroyers, planes, submarines, and mines, aboard a missile ship armed with 75mm cannons, Sea Sparrow and Harpoon missiles, depth charges, chaff, and an ECM radar jammer. Players get a 360 degree view around the ship through bow, port, starboard, and stern. Map, damage, briefing, and stores screens can be accessed.

Activision Entertainment, c/o Mediagenic, 415-329-0800 (see address list, page 14).
Circle #203 on Reader Service Card



Battling destroyers, planes, subs, and mines while navigating through a non-stop firestorm is all part of the fun of* Ocean Ranger.** ***The action takes place in four of the world's top military hotspots.



Previously released for the Amiga, the C-64 conversion of *ZOOM!* ($29.95) lets one or two players guide a character named Zoomer through 50 levels of an outer space Zoomland. Though he's being chased by a gang of enemies, the game's action is strictly non-violent. A 30 day unconditional money back guarantee is offered.

Discovery Software, 301-268-9877 (see address list, page 14).
Circle #193 on Reader Service Card

From MicroIllusions:

Faery Tale Adventure follows Philip, Julian, and Kevin through the wilderness, as they venture into caves, castles, and even the astral plane in search of the Dream Knight and the stolen Talisman.

The first in the One to One series of arcade games featuring one to one playability with the computer or another human, over a modem or in person, *Firepower* is a continuous action tank battle.

MicroIllusions, 800-522-2041 or 818-360-3715 (see address list, page 14).
Circle #204 on Reader Service Card

Accolade and Jack Nicklaus have signed a three year contract to produce home computer golf simulations. The first, *Jack Nicklaus' Greatest 18 Holes of Major Championship Golf,* is based on the recently released tape from the ABC Sports Video Library. C-64 gamers can play on 18 of Jack's favorite holes, as well as two of his invention.

GET ACCESS TO REAL BUYING POWER... WITH THE Ahoy! ACCESS CLUB!

Subscribing to *Ahoy!* and/or *Ahoy!'s AmigaUser* has always made sense—for you and for us. We get to keep more of your money when we cut out the middlemen (our distributor and your newsdealer), and we kick some of the savings back to you with a discount rate.

And now you can save even more—in fact, you can save the cost of your subscription many times over!

The *Ahoy!* Access Club, launched in January 1986, has been expanded to offer its members even more clout in the Commodore marketplace. And for a limited time, membership will be awarded free to subscribers!

Here are some of the ways the *Ahoy!* Access Club can boost your buying power:

- The *Ahoy!* Access Club *Clipper,* published 12 times a year, contains exclusive discount offers on products advertised in *Ahoy!* and *Ahoy!'s AmigaUser.* Participating vendors offer reductions of 10%, 20%, 30%, or more on selected items, free bonus merchandise, and special closeout and combo offers not advertised elsewhere—all for Club members only!
- The *Ahoy!* Access Club Card is your ticket to discounts at participating computer software, hardware, and book dealers, and reduced admission at Commodore and Amiga conventions and swap meets across North America. (Details are found in each issue of the *Clipper.)*
- The *Ahoy!* Access Club BBS (modem required) offers continuously updated information on new offers available through the Club, as well as late-breaking industry news, corrections and updates to articles in *Ahoy!* and *Ahoy!'s AmigaUser,* and free electronic mail facilities. Operation is 24 hours a day, 7 days a week—for Club members only!

If you are presently a subscriber to *Ahoy!* or *Ahoy!'s AmigaUser,* your membership has already been activated. You'll receive the *Ahoy!* Access Club *Clipper* bound into each issue.

If you're not a subscriber, fill out and return the postpaid card bound between pages 50 and 51 today!

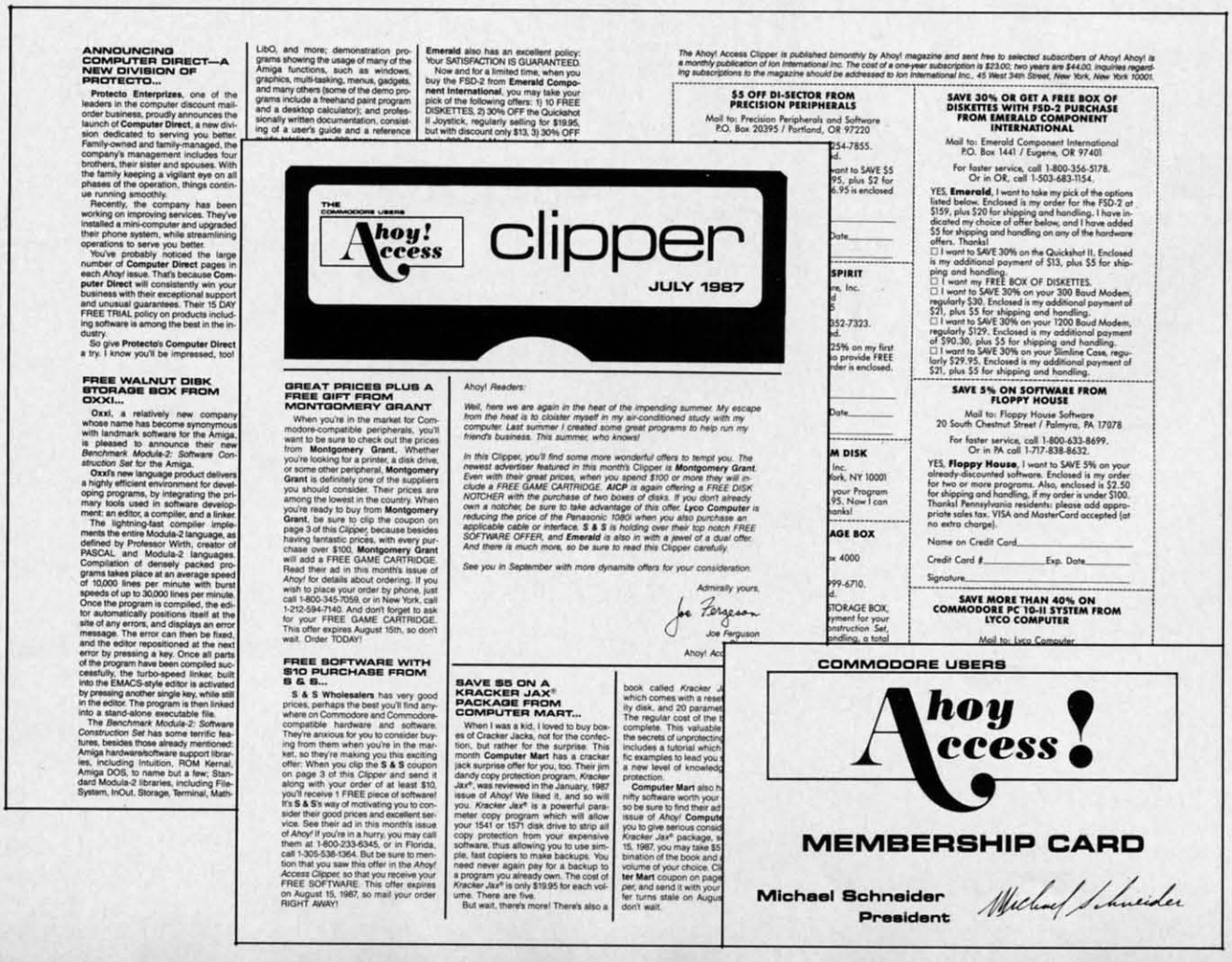
Let everyone else pay list price. You don't have to...when you have Access!

LOCK IN YOUR FREE MEMBERSHIP NOW!

Ahoy! Access Club membership will be included free with your paid subscription for a limited time only.

You are guaranteed free membership for the duration of any subscription paid for prior to December 31, 1988. After that date, a small additional charge may be levied.

So why not lock in free membership for as many years as you wish by extending your subscription now?



ANNOUNCING COMPUTER DIRECT—A NEW DIVISION OF PROTECTO...

Protecto Enterprizes, one of the leaders in the computer discount mail-order business, proudly announces the launch of **Computer Direct**, a new division dedicated to serving you better. Family-owned and family-managed, the company's management includes four brothers, their sister and spouses. With the family keeping a vigilant eye on all phases of the operation, things continue running smoothly.

Recently, the company has been working on improving services. They've installed a mini-computer and upgraded their phone system, while streamlining operations to serve you better.

You've probably noticed the large number of **Computer Direct** pages in each *Ahoy!* issue. That's because **Computer Direct** will consistently win your business with their exceptional support and unusual guarantees. Their 15 DAY FREE TRIAL policy on products including software is among the best in the industry.

So give **Protecto's Computer Direct** a try. I know you'll be impressed, too!

FREE WALNUT DISK STORAGE BOX FROM OXXI...

Oxxi, a relatively new company whose name has become synonymous with landmark software for the Amiga, is pleased to announce their new *Benchmark Modula-2: Software Construction Set* for the Amiga.

Oxxi's new language product delivers a highly efficient environment for developing programs, by integrating the primary tools used in software development: an editor, a compiler, and a linker.

The lightning-fast compiler implements the entire Modula-2 language, as defined by Professor Wirth, creator of PASCAL and Modula-2 languages. Compilation of densely packed programs takes place at an average speed of 10,000 lines per minute with burst speeds of up to 30,000 lines per minute. Once the program is compiled, the editor automatically positions itself at the site of any errors, and displays an error message. The error can then be fixed, and the editor repositioned at the next error by pressing a key. Once all parts of the program have been compiled successfully, the turbo-speed linker, built into the EMACS-style editor is activated by pressing another single key, while still in the editor. The program is then linked into a stand-alone executable file.

The *Benchmark Modula-2: Software Construction Set* has some terrific features, besides those already mentioned: Amiga hardware/software support libraries, including Intuition, ROM Kernal, Amiga DOS, to name but a few; Standard Modula-2 libraries, including FileSystem, InOut, Storage, Terminal, MathLibO, and more; demonstration programs showing the usage of many of the Amiga functions, such as windows, graphics, multi-tasking, menus, gadgets, and many others (some of the demo programs include a freehand paint program and a desktop calculator); and professionally written documentation, consisting of a user's guide and a reference

Emerald also has an excellent policy: Your SATISFACTION IS GUARANTEED.

Now and for a limited time, when you buy the FSD-2 from **Emerald Component International**, you may take your pick of the following offers: 1) 10 FREE DISKETTES, 2) 30% OFF the Quickshot II Joystick, regularly selling for $19.95, but with discount only $13, 3) 30% OFF

The Ahoy! Access Clipper is published bimonthly by Ahoy! magazine and sent free to selected subscribers of Ahoy! Ahoy! is a monthly publication of Ion International Inc. The cost of a one-year subscription is $23.00; two years are $44.00. Inquiries regarding subscriptions to the magazine should be addressed to Ion International Inc., 45 West 34th Street, New York, New York 10001.

$5 OFF DI-SECTOR FROM PRECISION PERIPHERALS

Mail to: Precision Peripherals and Software
P.O. Box 20395 / Portland, OR 97220

254-7855.
ed.
ant to SAVE $5
95, plus $2 for
6.95 is enclosed

Date

SPIRIT
re, Inc.
d
352-7323.
ed.
25% on my first
o provide FREE
der is enclosed.

Date

M DISK
Inc.
ork, NY 10001
your Program
95. Now I can
anks!

AGE BOX
x 4000
d.
999-6710.
STORAGE BOX,
yment for your
onstruction Set,
andling, a total

SAVE 30% OR GET A FREE BOX OF DISKETTES WITH FSD-2 PURCHASE FROM EMERALD COMPONENT INTERNATIONAL

Mail to: Emerald Component International
P.O. Box 1441 / Eugene, OR 97401

For faster service, call 1-800-356-5178.
Or in OR, call 1-503-683-7154.

YES, **Emerald**, I want to take my pick of the options listed below. Enclosed is my order for the FSD-2 at $159, plus $20 for shipping and handling. I have indicated my choice of offer below, and I have added $5 for shipping and handling on any of the hardware offers. Thanks!

☐ I want to SAVE 30% on the Quickshot II. Enclosed is my additional payment of $13, plus $5 for shipping and handling.
☐ I want my FREE BOX OF DISKETTES.
☐ I want to SAVE 30% on your 300 Baud Modem, regularly $30. Enclosed is my additional payment of $21, plus $5 for shipping and handling.
☐ I want to SAVE 30% on your 1200 Baud Modem, regularly $129. Enclosed is my additional payment of $90.30, plus $5 for shipping and handling.
☐ I want to SAVE 30% on your Slimline Case, regularly $29.95. Enclosed is my additional payment of $21, plus $5 for shipping and handling.

SAVE 5% ON SOFTWARE FROM FLOPPY HOUSE

Mail to: Floppy House Software
20 South Chestnut Street / Palmyra, PA 17078

For faster service, call 1-800-633-8699.
Or in PA call 1-717-838-8632.

YES, **Floppy House**, I want to SAVE 5% on your already-discounted software. Enclosed is my order for two or more programs. Also, enclosed is $2.50 for shipping and handling. If my order is under $100.. Thanks! Pennsylvania residents: please add appropriate sales tax. VISA and MasterCard accepted (at no extra charge).

Name on Credit Card_____
Credit Card #_____ Exp. Date_____
Signature_____

SAVE MORE THAN 40% ON COMMODORE PC 10-II SYSTEM FROM LYCO COMPUTER

Mail to: Lyco Computer

THE COMMODORE USERS Ahoy! Access clipper

JULY 1987

GREAT PRICES PLUS A FREE GIFT FROM MONTGOMERY GRANT

When you're in the market for Commodore-compatible peripherals, you'll want to be sure to check out the prices from **Montgomery Grant.** Whether you're looking for a printer, a disk drive, or some other peripheral, **Montgomery Grant** is definitely one of the suppliers you should consider. Their prices are among the lowest in the country. When you're ready to buy from **Montgomery Grant**, be sure to clip the coupon on page 3 of this *Clipper,* because besides having fantastic prices, with every purchase over $100, **Montgomery Grant** will add a FREE GAME CARTRIDGE. Read their ad in this month's issue of *Ahoy!* for details about ordering. If you wish to place your order by phone, just call 1-800-345-7059, or in New York, call 1-212-594-7140. And don't forget to ask for your FREE GAME CARTRIDGE. This offer expires August 15th, so don't wait. Order TODAY!

FREE SOFTWARE WITH $10 PURCHASE FROM S & S...

S & S Wholesalers has very good prices, perhaps the best you'll find anywhere on Commodore and Commodore-compatible hardware and software. They're anxious for you to consider buying from them when you're in the market, so they're making you this exciting offer: When you clip the **S & S** coupon on page 3 of this *Clipper* and send it along with your order of at least $10, you'll receive 1 FREE piece of software! It's **S & S's** way of motivating you to consider their good prices and excellent service. See their ad in this month's issue of *Ahoy!* If you're in a hurry, you may call them at 1-800-233-6345, or in Florida, call 1-305-538-1364. But be sure to mention that you saw this offer in the *Ahoy! Access Clipper,* so that you receive your FREE SOFTWARE. This offer expires on August 15, 1987, so mail your order RIGHT AWAY!

Ahoy! Readers:

Well, here we are again in the heat of the impending summer. My escape from the heat is to cloister myself in my air-conditioned study with my computer. Last summer I created some great programs to help run my friend's business. This summer, who knows!

In this Clipper, you'll find some more wonderful offers to tempt you. The newest advertiser featured in this month's Clipper is **Montgomery Grant.** *Even with their great prices, when you spend $100 or more they will include a FREE GAME CARTRIDGE.* **AICP** *is again offering a FREE DISK NOTCHER with the purchase of two boxes of disks. If you don't already own a notcher, be sure to take advantage of this offer.* **Lyco Computer** *is reducing the price of the Panasonic 1080i when you also purchase an applicable cable or interface.* **S & S** *is holding over their top notch FREE SOFTWARE OFFER, and* **Emerald** *is also in with a jewel of a dual offer. And there is much more, so be sure to read this Clipper carefully.*

See you in September with more dynamite offers for your consideration.

Admirally yours,

Joe Ferguson

Joe Ferguson

Ahoy! Acc

SAVE $5 ON A KRACKER JAX® PACKAGE FROM COMPUTER MART...

When I was a kid, I loved to buy boxes of Cracker Jacks, not for the confection, but rather for the surprise. This month **Computer Mart** has a cracker jack surprise offer for you, too. Their jim dandy copy protection program, *Kracker Jax®*, was reviewed in the January, 1987 issue of *Ahoy!* We liked it, and so will you. *Kracker Jax®* is a powerful parameter copy program which will allow your 1541 or 1571 disk drive to strip all copy protection from your expensive software, thus allowing you to use simple, fast copiers to make backups. You need never again pay for a backup to a program you already own. The cost of *Kracker Jax®* is only $19.95 for each volume. There are five.

But wait, there's more! There's also a book called *Kracker J* which comes with a reset ity disk, and 20 parames The regular cost of the t complete. This valuable the secrets of unprotecting includes a tutorial which fic examples to lead you a new level of knowledg protection.

Computer Mart also h nifty software worth your so be sure to find their ad issue of *Ahoy!* **Computer** you to give serious consid *Kracker Jax®* package, s 15, 1987, you may take $5 bination of the book and volume of your choice. Cl **ter Mart** coupon on page per, and send it with your fer turns stale on Augus don't wait.

COMMODORE USERS Ahoy! Access!

MEMBERSHIP CARD

Michael Schneider
President

Michael Schneider



Jack Nicklaus' Greatest 18 Holes *is based on the ABC video release.*

You can compete against Nicklaus, against three human opponents, or against a variety of computer-controlled men and women. Features include skins scoring or stroke play, pro, men's, or ladies' tees, wind intensity and direction, and uphill or downhill lies. The game will be available by Christmas shopping season.

Accolade, 408-985-1700 (see address list, page 14).

Circle #192 on Reader Service Card

As the *Global Commander* ($29.95) of the United Nuclear Nation in the year 2032, you are responsible for the welfare of the 16 aggressive, untrustworthy member nations. This involves managing the earth's economies, detente, resources, food supply, communications—and nuclear missiles. To head off the threat of world destruction you must fulfill all needs, cool hot tempers, mend stressed relations, and maintain military security. Your executive privileges include eavesdropping on radio transmissions, spying on illicit activities via satellite, and intercepting missiles with SDI systems.

Datasoft, c/o Electronic Arts, 415-571-7171 (see address list below).

Circle #224 on Reader Service Card

Mindscape has adapted three Sega coin-op titles to the 64:

Out Run ($34.95) lets you race a high performance auto through European cities, woods, beaches, and the Swiss Alps at speeds of up to 200 mph.

Space Harrier ($29.95) charges you, an astral exterminator, with the task of ridding the polluted galaxy of some of the most ghastly creatures imaginable.

In *Alien Syndrome* ($29.95) you must rescue people trapped inside an alien-infested genetic laboratory before the lab's self-destructing mechanism makes the job unnecessary.

Mindscape, 312-480-7667 (see address list below).

Circle #225 on Reader Service Card

Keep Your Collection Looking Shipshape with Ahoy! Binders



Don't be caught at sea the next time you need valuable programming information from a back issue of *Ahoy!* Our official binders turn a year's worth of *Ahoy!* into a textbook on Commodore computing! These quality-constructed binders use metal rods to hold each magazine individually, allowing easy reference to any issue without removal. Sporting a navy blue casing with a gold *Ahoy!* logo imprinted on the spine, these binders will be the pride of your computer bookshelf.

To order, send $12.45 (US funds) for each binder desired to:
Ahoy! Binders
45 West 34th Street—Suite 500
New York, NY 10001

(Outside Continental US add $2.50 per binder. Allow 4 to 6 weeks for delivery.)

Companies Mentioned in Scuttlebutt

Contact companies directly for more information; or save time and money by using the Reader Service Card bound between pages 50 and 51.

Abacus
5370 52nd Street SE
Grand Rapids, MI 49508
Phone: 616-698-0330

Access
545 W. 550 South, Ste. 130
Bountiful, UT 80410
Phone: 801-298-9077

Accolade
550 S. Winchester Blvd.
San Jose, CA 95128
Phone: 408-985-1700

Activision
3885 Bohannon Drive
Menlo Park, CA 94025
Phone: 415-329-0800

Blue Lion Software
90 Sherman Street
Cambridge, MA 02140
Phone: 617-876-2500

Broderbund Software
17 Paul Drive
San Rafael, CA 94903-2101
Phone: 415-492-3200

Commodore
1200 Wilson Drive
West Chester, PA 19380
Phone: 215-431-9100

Datasoft
c/o **Electronic Arts**
1820 Gateway Drive
San Mateo, CA 94404
Phone: 415-571-7171

Digiscape Software
P.O. Box 113058
Carrollton, TX 75011-3058
Phone: 214-241-9891

Discovery Software
163 Conduit Street
Annapolis, MD 21401
Phone: 301-268-9877

Epyx
600 Galveston Drive
P.O. Box 8020
Redwood, CA 94063
Phone: 415-368-3200

Exhibition Marketing
8300 Greensboro Drive
McLean, VA 22102
Phone: 703-893-4545

Gamco Industries, Inc.
Box 1911
Big Spring, TX 79721
Phone: 800-351-1404; in TX 915-267-6327

Haitex Resources
208 Carrollton Park, Suite 1207
Carrollton, TX 75006
Phone: 214-241-8030

LLM Press
150 Broadway
New York, NY 10038
Phone: 212-766-3785

MicroIllusions
17408 Chatsworth Street
Granada Hills, CA 91344
Phone: 800-522-2041; in CA 818-360-3715

Mindscape Inc.
3444 Dundee Road
Northbrook, IL 60062
Phone: 312-480-7667

Online Information Network
5707 South 86th Circle
P.O. Box 27347
Omaha, NE 68127
Phone: 402-593-4593

Precision Incorporated
8404 Sterling St., Suite A
Irving, TX 75063
Phone: 214-929-4888

Schnedler Systems
25 Eastwood Road
P.O. Box 5964
Asheville, NC 28813
Phone: 704-274-4646

Simon & Schuster Software
One Gulf+Western Plaza
New York, NY 10023
Phone: 212-373-8882

Zwetzig Associates
5932 Bruns Court
Oakland, CA 94611
Phone: 415-339-9396

Circle #214 on Reader Service Card →

IT'S A JUNGLE OUT THERE AND DATA EAST PUTS YOU IN IT.





It happens so fast. You're kicking back, you and your best friend, just checking out two of the latest arcade action games from Data East and, zap, you're fighting with full fire power and up to your neck in heart-stopping, eye-popping jungle.

Victory Road pits the heroes of the #1 smash hit, ***Ikari Warriors,*** against a hideous horde that has heroes for lunch—Stonehead and his wrecking crew of bizarre and brutal beasts.



Guerrilla War takes you behind the headlines to the battlelines. It's you versus them—and let us guarantee you that "them" is an army of evil that will keep your trigger finger active for hours.

Victory Road for the IBM, Commodore and Apple II computers. And ***Guerrilla War,*** for the IBM and Commodore computers. Addictive action with great graphics. Hey, it's a jungle out there. And now we've brought it home.

DATA EAST

DATA EAST USA, INC. 470 Needles Drive, San Jose, CA 95112 (408) 286-7074

IBM SCREENS SHOWN. OTHER COMPUTER VERSIONS MAY VARY.

© Data East USA, Inc. Victory Road and Guerrilla War are registered trademarks of SNK Corp. Manufactured under license by Data East USA, Inc.

Protecto's

COMPUTER DIRECT

Since 1979

WE WON'T BE UNDERSOLD!*

Prices Expire 12-31-88

Complete C64c Commodore System



- Commodore 64c Computer
- 1541 II Disk Drive
- 12" Monochrome Monitor
- Genuine IBM® Printer With Interface And One Roll Of Paper
- GEOS Program For Word Processing & Drawing

Our Low Sale Price

$395.95

List $825

C128D Computer



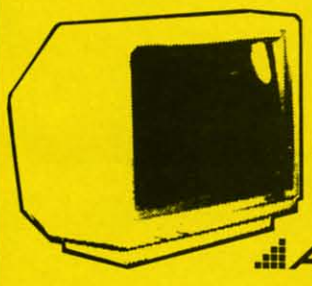
- Full 128 Detached Keyboard
- 1571 Drive With 128K Of User Memory Expandable To 640K
- 3 Operation Modes (C64, C128, & CP/M, Ver. 3.0)
- 40/80 Column Output, 16 colors
- **Free Programmer's Reference Guide**

Our Low Sale Price

$419.95

List $549

12" Amber Monitor



2 Year Limited Manufacturer's Warranty

AMDEK

- High Resolution
- 80 Column
- 1000 Lines At Center
- Great For Business
- Fantastic Value

Our Low Sale Price

$79.95

List $329

5¼" Floppy Disks

Double Sided Double Density
Minimum Quantity 50
Maximum Quantity 250

19¢ each

Box of 50 ..... **$9.50 (19¢ each)**
(without sleeves)

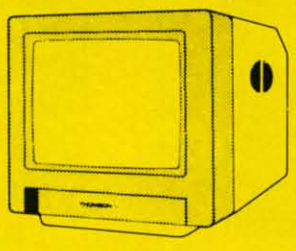
Box of 50..... **$10.50 (21¢ each)**
(with sleeves)

Box of 100 (no limit)... **$24.00 (24¢ each)**
(with sleeves & labels)

Economy Sleeves	$1.00 per quantity of 50
Disk Labels	$3.95 per quantity of 100
Disk Notchers	$3.95 each

- 100% Certified
- 100% Made in the U.S.A
- State-of-the-art Technology
- Unconditional guarantee

13" RGB/Composite Color Monitor



THOMSON

The Vision of Personal Computers.

- Black Dot Screen
- 3 Monitors In One - Composite/RGB/80 Column
- Green Screen Only Switch
- Cables Included (please specify computer)

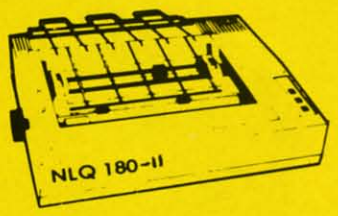
Our Low Sale Price

$199.95

List $399

Hi-Speed NLQ 180-II

New Two-Year Warranty



- Dot Addressable Graphics
- High Speed Dot Matrix
- Italics - Elite - Condensed - Pica
- Tractor/Friction Feed
- Centronics Parallel Port
- * Lifetime Warranty on Print Head
- 8K Print Buffer
- Near Letter Quality from Front Panel
- Low Cost Adapters available

Our Low Sale Price

$149.95

List $499

IMMEDIATE ANSWER

Call **800 - BUY - WISE**

800 - 289 - 9473

Mail

We Love Our Customers!

COMPUTER DIRECT
22292 N. Pepper Rd.
Barrington, IL 60010

BEST SERVICE IN THE USA (Price is Not Enough!)

- Fast, Low Cost Delivery
- 15 Day Home Trial
- Free Technical Assistance
- No Credit Card Fees
- 90 Day Immediate Replacement
- Free Catalogs

Genuine IBM® Printer

8½" Letter Size • 80 Column
Limited Quantities



- Upper & Lower Case (with true lower descenders)
- Advanced Dot Matrix - Heat Transfer
- Graphics With Commodore, & Apple Interfaces
- Ready to Hook Up To Serial Port Of IBM® PCjr.
- Low Cost Adapters For IBM®, Apple, Commodore, & Laser Computers
- Underline & Enlarged

Our Low Sale Price

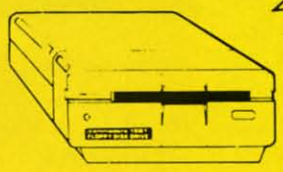
$49.95

List $199

800K 3½" Disk Drive

Commodore 1581 Works With C64/C64c, and C128/C128D.
Over 800K Bytes of Formatted Storage On Double-Sided 3.5" Microdiskettes.

Super 81 Utilities Sale $29.95



Our Low Sale Price

$179.95

List $249

13" Color Composite Monitor



- Anti-Glare Screen
- Audio Speaker
- Volume Control
- Black Matrix Tube
- Horizontal Resolution 260 Lines
- Includes Composite Cable

Our Low Sale Price

$149.95

List $329

300/1200/2400 BPS External Modem



Modem 2400 Features:

- 2400 BAUD Bell 212A at 300/1200/2400 BPS
- Fully Hayes Compatible
- 7 System Indicator Lights
- Both Tone & Pulse Dialing
- Built-In Speaker with Volume Control
- Buffer That Holds Up To 40 Characters
- Stores Dialed Numbers
- Separate Line and Set Connectors
- Uses RS-232C Interface (Cable Required)

Our Low Sale Price

$114.95

List $349

1541-II Disk Drive

1541/1571 Drive Alignment Sale $19.95



Thousands of the most popular Software titles in stock!

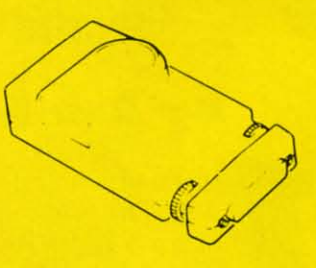
Our Low Sale Price

$159.95

List $299

300/1200 BPS Migent Pocket Modem

Free Terminal Software



- Hayes compatible
- Runs on AC or battery
- Turns on/off automatically
- Small enough to put in your pocket
- Plugs directly into your serial port on many computers
- Easy to use; no switches to set
- On-screen status lights show call progress

Our Low Sale Price

$99.95

List $413

VISA
MASTER CARD
COD

* Prices do not include Shipping Charges. Call to get Your Lowest Delivered Cost. We insure all shipments at no extra cost to you! All packages are normally shipped UPS Ground. 2nd Day or Overnight delivery available. Minimum shipping charge per order is $3.75, Illinois residents add 6½% sales tax. We ship to all points in the U.S; Canada, Puerto Rico, Alaska, Hawaii, Virgin Islands and APO-FPO. (Monitors only shipped in Continental USA) Prices and availability subject to change without notice. Computer Direct will match any valid nationally advertised delivered price on the exact same product & payment method (excluding sales taxes)

Circle #213 on Reader Service Card

TUBULAR!

For the C-64

By Bob Blackmer

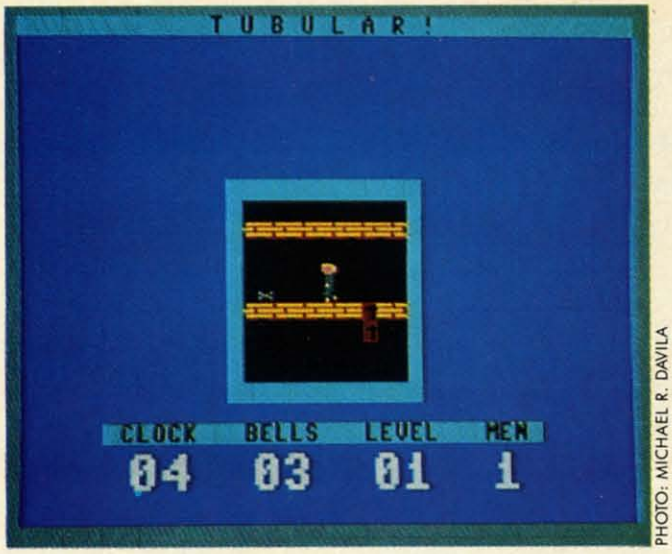


PHOTO: MICHAEL R. DAVILA

Tubular! is an addictive multilevel arcade game for the C-64. The object is simple: collect the 14 bells and make it to the top of a huge pyramid. I've designed 16 different and challenging levels for your enjoyment.

The only way you get from floor to floor is through the high pressure tubes that turn the pyramid into a giant maze. The up and down tubes are clearly marked and of different colors. Step over a down tube and it activates, rushing you downward. Sometimes the tubes will be stacked, and if you do nothing you will continue through the next tube. Pushing on the joystick left or right when you reach a floor will allow you access to that floor. There will be times when you go up and there is no way down again, which is disastrous if you miss any bells.

The only access to the top floor is an up tube which appears when you have gathered all the bells. Some levels you will find easy to solve, others will give you a hard time. Consider yourself a true puzzle solver if you can master all 16 levels.

You start out in the bottom right hand corner of the pyramid, and have 90 seconds in which to complete a level. To help you out, you get an extra life with each level completed, up to a maximum of nine. I've also included a kill key which is activated by pressing the RUN STOP key; you'll know when to use it.

I'm sure you will find this program addictive and challenging, which, judging by your letters, is what you want.

Tubular! is written entirely in machine language for speed and playability, and must be entered using *Flankspeed* (see page 63). After typing in and saving a copy, reset the machine and LOAD "TUBULAR!",8,1. Then SYS 49152 to start. □ ***SEE PROGRAM LISTING ON PAGE 64***

TRI WORDS

For the C-128

By Bob Blackmer



PHOTO: MICHAEL R. DAVILA

Tri Words is an entertaining word game for the C-128 that is also useful as an educational tool. You play against the computer, forming three-letter words from a grid of 16 jumbo sized letters which are chosen randomly for each game. The program utilizes its own built-in database to select words and to check your word for validity.

You can set the intelligence level of the computer. The computer will select words according to their usage and familiarity. Simple words like CAT will appear early in the game, while vague words such as OHM will only show up late in the game. I advise linguists who seek a challenge to select the super brain.

Type in the second program, TRI.DATA (page 71), first. When this program is run it will check the data for any typing errors. If your typing is correct, the program prompts you to press a key to write the binary database WORDFILE to disk. The main program will load this file at the start of each session, so save it on the same disk as the main program.

Using a standard dictionary to establish the word list, I have omitted all slang words and abbreviations. Only legal words are contained in the final list of 489, which will provide a formidable challenge.

The game is designed as you against the computer, but is great played in groups. Everyone can help form words while one person handles the input.

You will be prompted to enter your word. Type in any three letter word and press RETURN. The program will inform you if your word contains double letters (each word must use three different letters—double letter words like

Continued on page 74

Circle #208 on Reader Service Card →



There's so much to do on Q-Link, it can't all fit into this ad. For that, you'll need our full-color program guide, with a complete calendar of events and activities. And you'll get that free from Q-Link every month.

A special offer.

If you don't have a modem, Q-Link will help you get one at a price lower than anyone could imagine. For details, take a look at the attached card, or call 1-800-782-2278, Ext. 1580.

You'll also get a free Q-Link Starter Kit, including software. It's easy to get going and there's plenty of online support every step of the way. Like Q-Link support groups and helpful Q-Guide experts.

Until now, you and your Commodore® could only talk to each other.



Welcome to Q-Link.

You and your Commodore® probably have a very good relationship. But even the best relationships need to grow. That's why there's Q-Link.

Q-Link connects you with tens of thousands of friendly, interesting people all over the country. Share stories, talk shop, tell jokes, or just shoot the breeze with them in a whole new way. On your Commodore.

When you and your Commodore start talking to the rest of the world with Q-Link, exciting things start to happen. Things that are sure to improve your relationship. Like playing the latest interactive, full-color games. Taking college courses. Accessing over 15,000 software programs. Enjoying guest speakers on a wide range of topics.

And Q-Link gives you a direct connection to the experts at Commodore headquarters as well as the major software publishers – a Q-Link exclusive.

Getting into Q-Link.

You'll love being a member of Q-Link. You pay only $9.95 a month (and any local phone charges) for "Basic" service, which includes unlimited access to the latest news, sports, and entertainment information. Even a full-featured encyclopedia. We also offer "Plus" services such as shopping and travel reservations for only 8¢ per minute extra.

It's time you and your Commodore got out and talked to more interesting people than just each other. And on Q-Link, it couldn't be easier.

To join Q-Link now, call:

1-800-782-2278

Ext. 1580

Q-link

Add new life to your Commodore®

HAPPY HOLIDAYS TO OUR MANY COMMODORE FRIENDS & CUSTOMERS

SOFTWARE SUPPORT INTERNATIONAL

CONVENIENCE – FAST SERVICE – RELIABILITY – SUPPORT

Abacus Software

128 Internals (book)	17.36
128 Tricks & Tips (book)	17.36
1571 Internals (book)	17.36
Basic Compiler 64	24.97
Basic Compiler 128	36.97
Becker Basic for Geos	33.97
Cad Pak 64	24.97
Cad Pak 128	36.97
Chart Pak 64	24.97
Chart Pak 128	24.97
Cobol 64	24.97
Cobol 128	36.97
CP/M for the C-128(book)	17.36
Super C Compiler 64	36.97
Super C Compiler 128	36.97
Super Pascal 64	36.97
Super Pascal 128	36.97
Geos Inside & Out Book	17.36
Geos Inside & Out Disk	12.76
Geos Tricks & Tips Book	15.20
Geos Tricks & Tips Disk	12.76

ACCESS Software Incorporated

Echelon w/Lipstick	27.97
Heavy Metal	Call
LB & Tourn & Exec	13.97
Mach 5	21.97
Mach 128	30.97
Raid Moscow & Beachead 1&2	13.97
World Class Leader Board	24.97
W/C L/B Fam/Courses 1	12.97
W/C L/B Fam/Courses 2	12.97
W/C L/B Fam/Courses 3	12.97

ACCOLADE

Apollo 18	18.97
Bubble Ghost	18.97
Card Sharks	18.97
Fast Break	18.97
Fourth & Inches	18.97
Fourth & Inches Team Const.	9.97
Miniputt	18.97
Power at Sea	18.97
Rack-em	18.97
Serve & Volley	18.97
T.K.O.	18.97
Test Drive	18.97
The Train	18.97

ABSOLUTE

Crossbow	21.97
F-18 Hornet	21.97
Space	21.97

ACTIVISION ENTERTAINMENT SOFTWARE

Aliens	21.97
Blackjack Academy	24.97
Faery Tales	30.97
Fire Power	15.97
Last Ninja	21.97
Main Frame	21.97
Maniac Mansion	21.97
Might & Magic	24.97
Might & Magic Hints	10.97
Predator	18.97
Rampage	21.97
Romantic Encounters	24.97
Sky Travel	30.97
USS Ocean Ranger	21.97

Softworks

Desk Pak I/Font Pak I/Geodex I	31.97
Desk Pak Plus*	18.97
Font Pack Plus*	18.97
Geos 64 V2.0	36.97
Geos 128	42.97
Geobasic	Call
Geocalc 64	30.97
Geocalc 128	42.97
Geofile 64	30.97
Geofile 128	42.97
Geoprogrammer 64	42.97
Geoprogrammer 128	42.97
Geopublish 64	42.97
Geospell	18.97
Geowriter's Workshop 64	30.97
Geowriter's Workshop 128	42.97

BOX OFFICE

$100,000 Pyramid	9.97
Alf	9.97
California Raisins	15.97
Psycho	15.97

Broderbund Software

Arcade Game Const. Set	18.97
Bank Street Writer	30.97
Bank Street Filer	18.97
Bank Street Mailer	15.97
Bank Street Speller	15.97
Carmen Sandiego Europe	24.97
Carmen Sandiego USA	24.97
Carmen Sandiego World	21.97
Downhill Challenge	15.97
Print Shop	27.97
Print Shop Companion	21.97
P/S Graphics Disk 1	15.97
P/S Graphics Disk 2	15.97
P/S Graphics Disk 3	15.97
P/S Holiday Graphics	15.97
Quest for Clues (book)	19.97
Star Wars	18.97
Toy Shop	18.97

CAPCOM

Ghosts & Goblins	18.97
Hat Trick	18.97
Minigolf	18.97
Side Arms	18.97
1942	18.97

CINEMAWARE

Defender of the Crown	21.97
King of Chicago	21.97
SDI	21.97
Sinbad	21.97
Rocket Ranger	21.97
Three Stooges	21.97
Warp Speed (Cart)	30.97

DATA EAST

Breakthru	18.97
Commando	9.97
Ikari Warriors	18.97
Karate Champ	9.97
Karnov	18.97
Kid Niki	18.97
Kung Fu Master	9.97
Lock On	Call
Platoon	18.97
Speed Buggy	18.97
Tag Team Wrestling	13.97
Victory Road	18.97

DATASOFT

Alternate Reality:City	19.36
City Hint Book	7.97
Alternate Reality:Dungeon	25.48
Dungeon Hint Book	7.97
Cosmic Relief	16.30
Androids Decision	16.30
Firezone	16.30
Hunt For Red October	25.48
Video Title Companion 2	13.24
Video Title Shop w/Comp 1	19.36

Digital Superpak

Dictionary Disk	9.97
Digital Superpak 2	60.97
Pocket Filer 2	36.97
Pocket Planner 2	36.97
Pocket Writer 2	36.97

ELECTRONIC ARTS

Alien Fires	19.36
Bard's Tale I	25.48
Bard's Tale I Hints	9.97
Bard's Tale II	25.48
Bard's Tale II Hints	9.97
Bard's Tale III	25.48
Bard's Tale III Hints	9.97
Caveman Ugh-lympics	19.36
Chessmaster 2000	25.48
Chuck Yeager's AFS	22.42
Deathlord	19.36
Deathlord Hints	9.97
Double Dragon	22.42
Earth Orbit Station	10.97
Instant Music	19.36
Jordan vs Bird One on One	19.36
Legacy of the Ancients	19.36
Marble Madness	10.97
Mars Saga	22.42
Mavis Beacon Typing	25.48
Modem Wars	22.42
Monopoly	19.36
PaperClip 3	31.60
PaperClip Publisher	31.30
Pegasus	19.36
Scrabble	21.40
Scrupples	25.48
Skate or Die	19.36
Skyfox II	19.36
Strike Fleet	19.36
Twilights Ransom	22.42
Twilights Ransom Hints	7.97
Wasteland	25.48
Wasteland Hints	9.97

EPYX

Battleship	18.97
California Games	24.97
Champ. Wrestling	24.97
Create A Calendar	18.97
Destroyer	24.97
Fast Load Cartridge	24.97
Final Assault	24.97
4 X 4 Racing	24.97
The Games:Summer Edition	24.97
The Games:Winter Edition	24.97
Home Video Producer	30.97
Impossible Mission II	24.97
L.A. Crackdown	24.97
Legend of Black Silver	24.97
Metrocross	12.37
Mind Roll	24.97
Sporting News Baseball	24.97
Sports-A-Roni	15.97
Street Sports:Baseball	24.97
Street Sports:Basketball	24.97
Street Sports:Football	24.97
Street Sports:Soccer	24.97
Sub Battle Simulator	24.97
Summer Games II	12.97
Technocop	24.97
Tower Toppler	24.97
Winter Games	12.97
World Games	24.97

FIREBIRD

Elite	11.97
Elite Hint Book (Leroy)	6.97
Guild of Thieves	24.97
Jinxter	21.97
Star Glider	24.97
Tracker	24.97

FIRST ROW

Honeymooners	24.97
Star Empire	15.97
Twilight Zone	24.97

GAMESTAR

Champ. Baseball	18.97
Champ. Basketball	21.97
GFL Football	21.97
Main Event	18.97
Star Rank Boxing II	18.97
Boxing I/Tennis	18.97

INKWELL

Flexidraw 5.5	24.06
Flexifont	20.76
Graphics Integrator 2	20.76
Light Pen (184C)	42.97
Graphics Gallery 1	20.75
Graphics Gallery 2	20.75

KONAMI

Boot Camp	18.97
Contra	18.97
Rush'N Space Attack	18.97
Yie Ar Kung Fu 2	18.97

MICRO PROSE

Airborne Ranger	21.97
Gunship	21.97
Pirates	24.97
Project Stealth Fighter	24.97
Red Storm Rising	24.97

MINDSCAPE INC.

Bad Street Brawler	18.97
Block Buster	18.97
Bop & Wrestle/Infiltrator 2	24.97
Captain Blood	21.97
Clubhouse Sports	18.97
Crossword Magic	30.97
Deja Vu	21.97
Eagles Nest/Infiltrator 1	24.97
Indy Jones/Temple of Doom	21.97
Misi Soccer	21.97
Road Runner	21.97
SuperStar Ice Hockey	21.97
SuperStar Soccer	21.97
Uninvited	21.97
Xevious	18.97

ORIGIN

Autoduel	33.36
Moebius	26.88
Ogre	20.40
Ultima 1	26.88
Ultima 3	26.88
Ultima 4	39.84
Ultima 5	39.84

PROFESSIONAL

Professional Software Inc.

Fleet System 2+	36.97
Fleet System 4	48.97

SSI STRATEGIC SIMULATIONS INC

Eternal Dagger	25.97
Gemstone Healer	10.97
Gemstone Warrior	10.97
Heroes of the Lance	19.47
Phantasie I	25.47
Phantasie II	25.47
Phantasie III	25.47
Pool of Radiance	25.47
Questron I	10.97
Questron II	25.47
Rings of Zilfin	25.47
Shard of Spring	25.47
Typhoon of Steel	31.97
Wargame Construction Set	19.47
Wizard's Crown	25.47

SHARE DATA

Concentration	9.95
Family Feud	9.95
High Rollers	9.95
Jeopardy	9.95
Jeopard Jr.	9.95
Wheel Of Fortune	9.95
Wheel of Fortune 2	9.95
Wheel of Fortune 3	9.95
Card Sharks	9.95

SOLUTIONS UNLIMITED

Billboard Maker	24.97
Grafix Link	12.97
Icon Factory	24.97
Photo Finish	18.97
Screen F/X	21.97

SPRINGBOARD

Certificate Maker	14.97
Certificate Maker Libr.I	10.97
Newsroom	14.97
Newsroom Clipart 1 or 2 or 3	10.97
P/S Graphic Expander	23.64

subLOGIC

Flight Simulator II	33.97
Flight Sim Scenery 1	14.16
Flight Sim Scenery 2	14.16
Flight Sim Scenery 3	14.16
Flight Sim Scenery 4	14.16
Flight Sim Scenery 5	14.16
Flight Sim Scenery 6	14.16
Flight Sim Scenery 7	17.46
Flight Sim Scenery 11	17.46
Flight Sim Scenery 14	17.46
Flight Sim Scenery Japan	17.46
Flight Sim Scenery SanFran	17.46
Jet 2	27.36
Stealth Mission	33.96

TAITO

Alcon	18.97
Arkanoid	18.97
Bubble Bobble	21.97
Gladiator	18.97
Operation Wolf	24.97
Qix	18.97
Sky Sharks	18.97
Rastan	21.97
Renegade	21.97

timeworks

Accounts Payable	33.36
Accounts Receivable	33.36
Data Manager 2	17.16
Data Manager 128	33.36
Desktop Publisher	39.84
Electronic Checkbook	13.92
General Ledger	33.36

timeworks

Inventory Management	33.36
Partner 64	33.36
Partner 128	39.84
Payroll Management	33.36
Swiftcalc/Sideways 64	17.16
Swiftcalc/Sideways 128	33.36
Sylvia Porter F/P 64	33.36
Sylvia Porter F/P 128	46.32
Word Writer 3	33.36
Word Writer 128	33.36

UNISON WORLD INCORPORATED

Art Gallery 1	15.97
Art Gallery 2	15.97
Art Gallery 4 Amer Hist	Call
Art Gallery 3	15.97
Printmaster Plus	21.97

MISCELLANEOUS

Art Worx/Bridge 5.0	21.97
Assembly for Kids (book)	13.76
Avalon Hill NBA Basketball	24.97
Basic 8	29.95
Beginner's Guide/Basic 8	19.95
Big Blue Reader 128/CP/M	27.97
Bob's Term Pro 64	30.97
Bob's Term Pro 128	36.97
B/W Business Form Shop	24.97
B/W Geos Word Publisher	24.97
Club Backgammon	20.40
CSM Drive Align Kit	30.12
CSM Protection Manual I	23.97
CSM Protection Manual II	27.97
Dark Castle (3-60)	21.97
Doodle	24.97
Flexfile 128	30.97
Font Master 2	30.97
Font Master 128	36.97
Geneology:Family Tree 64	36.97
Geneology:Family Tree 128	36.97
Geos Companion 1	18.97
Hes Mon 64 (cart)	9.95
IHT/CAD 3D	30.97
Lotto Program	24.95
Merlin Assembler 64	30.97
Merlin Assembler 128	42.97
Microlawyer	36.97
Microleague WWF Wrestling	24.95
MSD DOS Reference Guide	24.95
Paul Whitehead Chess	21.97
Sam's/C-64 Prog. Base Ref. Guide	16.97
Softsync Pers. Newsletter	36.97
Strip Poker	18.97
Poker Data Disk 1	12.97
Poker Data Disk 2	12.97
Poker Data Disk 3	12.97
Superbase 64	36.97
Superbase 128	42.97
Superbase the Book	13.97
Super Sunday	23.64
Superscript 64	30.97
Superscript 128	42.97
Tab Books/Adv 128 Grap/Snd	13.97
Tab Books/C64 Trouble Shoot	14.97
Tab Books/C64 Serious Prog	9.97
Vampire's Empire	18.97
Wizardry/Sir Tech	24.97
Wizardry 2	24.97

ACCESSORIES

1541/71 Serial Cable	4.95
1541/71 Power Cable	4.95
C-128 RGB Monitor Cable (color)	7.95
C-128 RGB Monitor Cable (comp)	5.95
C-64 Color Monitor Cord	4.95
C-64 Repairable Power Supply	39.95
C-128 Repairable Power Supply	49.95
RS-232 Interface (Omnitronics)	36.95
MW 350 Printer Interface	49.95
Aprospand 64	27.95
Aprospand Extender Cable	15.95
Aprotek 1200 Baud Minimodem	79.95
Commodore 1351 Mouse	37.95
Mouse Mat	8.95
1541 Dust Cover	8.95
1571 Dust Cover	8.95
C-64 Dust Cover	8.95
C-64C Dust Cover	8.95
C-128 Dust Cover	8.95
Disk Notcher-Square Cut	4.95
5.25" Disk Drive Cleaner	5.95
3.5" Disk Drive Cleaner	6.95
10 Cnt Disk Storage	1.95
50 Cnt Disk Storage	8.95
100 Cnt Disk Storage w/Lock	12.95
80 Cnt 3.5" Disk Stor. w/Lock	9.95
3.5" Disk Labels-25 cnt	1.00
5.25" Disk Labels-96 cnt	1.00
3.5" DS/DD Diskettes	1.29
5.25" DS/DD Diskettes-Black	.39
5.25" DS/DD Diskettes-10 colors	.79
Write Protects-100 cnt Black	1.00
Tyvek Sleeves-High Quality	ea .09
Slik Stik-Joystick	6.95
Quick Shot II-Joystick	7.95
Tac 2-Joystick	10.95
Tac 3-Joystick	11.95
Touch-It Static Strip	8.95
Suncom Icon Troller	17.95
Surge Protector/Power Pad	39.95

MANY OTHER C-64/128 TITLES AVAILABLE — CALL FOR PRICES!

ALL NEW

Introducing the 1541 RAMBOard

Copy protection's "worst nightmare"

The dream has been there for years now: an inexpensive piece of hardware that, when added to your system, would allow you to backup almost every single piece of software ever released for the C64.

Software Support has just made the dream a reality!

We're proud to introduce the 1541 RAMBOard, a small card that can easily be installed into your 1541/1541C disk drive in 5 minutes using just a screwdriver. With this powerful card in place, backup hassles are a thing of the past! Working with special software, the RAMBOard will backup software that other utilities can't even scratch the surface of. And as new protection schemes arrive, we'll create new parameters to keep your RAMBOard operating behind enemy lines.

RAMBOard also comes bundled with a fast copier that can archive an unprotected data disk in under 50 seconds!

The concepts behind "card" systems are public domain. So why should you have to pay $44.95 or more for someone else's "card"? Software Support will sell you the hardware* for just $26.95!!! So if you don't have an unlimited income, don't worry. Just order your new RAMBOard from Software Support -- the company that's declared war on high prices.

RAMBOard -- Our Price: $26.95

Other companies "card" boards: $44.95 or more.

*The 1541 RAMBOard requires software to operate. This software can be either RAMBOard parameters, soon to be found on our Renegade program disk, or any of the other "card" software already on the market.

NEW V2.0

RENEGADE

NEW V2.0

Here's what the world's toughest critics have to say.

If you think the toughest critics work for the magazines, you're wrong. The toughest critics are the people who actually use a program day in and day out. The people who depend on a program to do exactly what it says it will do. The people who pay out hard-earned money to buy a program — and who want to make sure they're getting their money's worth. The toughest critics aren't the people who review a program — they're the people who actually own the program.

Here's what some of those people have to say about Renegade:

- Thanks for (a) dream come true. *W.C., FL*
- We waited long enough! But, the best things come to (those) who wait. *C.P., CT*
- Very impressed!!! *T.W., MI*
- More than meets (my) expectations; great! *D.S., WI*
- Well worth the long wait!!!! *G.H., MO*
- Subscription service is a great innovation. *B.C., CA*
- Excellent! It's all I'll use! Keep up the good work. *J.D., NH*
- Finally, the last copier I'll need to buy!!!!!! *P.G., NC*
- Thanks for (your) user support! *A.S., TX*
- C64 owners have needed this for quite some time. *R.C., NY*

Renegade is a synthesis of the best utilities ever created by the best programmers ever assembled on a project of this nature. Not only is Renegade the only archival software a Commodore owner needs, it's so advanced it's now the only archival software we make. This means all our R&D effort goes into making sure that nothing else on the market comes close to Renegade's capabilities.

FEATURES INCLUDE:

- 1541/1581/1571 Fast File Copier-Any Direction
- Single or Dual State of the Art Nibbler
- GCR Editor: For the Experienced Hacker
- 300+ Parms: For those tough to backup disks
- Geos™ File Copier-Works under Desktop
- Capable of Archiving RapidLok Protection
- Error Scanner with Unique Sector Editor
- Popular subscriber service available!
- Single or Dual High Speed Data Copier
- Directory Editor: Organize your Disks
- Geos™ Modual: PARAMETERS and TOOLS
- Compatible with C-64/128 with 1541/71 Drives
- Dump Parameter Catalog to Printer
- Scrolling M/L Monitor with Drive Mon
- Byte Pattern Scanner: High Speed Searches
- Technical support available: of course

Renegade comes with over 300 parameters, and additional parameters are available every two months! Also, Renegade program updates are available to registered owners 3 times a year to ensure that Renegade will always be a step ahead of anything else on the market.

In the software industry, companies live and die by consumer opinion. Some companies have to learn the hard way that people won't take unlimited abuse for very long. But in this volatile market, there's one thing we know for certain -- there are a lot of awfully tough critics out there saying things about us. And at Software Support International, we're working hard to make sure they keep right on talking.

Attention: Registered Renegade owners!
Parameter Modual #3 is now available, Only $9.95
Renegade V2.0 Upgrade also available, Only $9.95

RENEGADE V2.0 with Parameter Moduals 1-3

Only $34.95

FLASH! Kracker Jax Earns a 5 Star Rating In INFO's May-June '88 Issue

Kracker Jax is the powerful parameter based copying system that has taken the country by storm! What IS a parameter? It's a custom program that allows your 1541 or 1571 disk drive to strip ALL copy protection from your expensive software, leaving you with UNPROTECTED, TOTALLY BROKEN BACKUPS that can even be copied with a simple fast copier!

We declare **Kracker Jax** to be the best system of its kind on the market today! A bold claim? Maybe.

But don't take our word for it—if you want the REAL story on how good **Kracker Jax** is just ask one of our customers. Don't worry. You won't have any problem finding one.

Vols 1 thru 7 **Only $9.95 each**

NEW LOW PRICE

ALL NEW

1581 TOOLKIT

When we program a utility, we DO IT RIGHT

ALL NEW

Our customers demand the finest, so we can settle for no less. The 1581 TOOLKIT represents the finest set of disk utilities ever creaed for the 1581 disk drive. All of our routines are Ultra-Fast and represent state of the art programming. We support partitioning wherever applicable.

Features Include:

- Fast Copier (one or two drives): Backup over 800K in UNDER 2 MINUTES! This utility even reports errors.
- Fast File Copier (one or two drives): 1541/81/71 compatable - any direction - with partitioning.
- Track and Sector Editor: view and modify data easily on your 3 1/2 inch diskettes
- Directory Editor: organize whole disk directories or partitions - this tool is indespensible.
- Byte Pattern Search: We modified our famous utility to support the 1581 disk drive. You'll love it!
- Error Scanner: Scan important disks for possible problems. This is a one of a kind utility.
- File Track and Sector Tracer: Scan and modify files fast, Even supports partitioning.
- Fast Formatter: Allows fast formatting of either whole disks or ranges of tracks, you decide.
- Relocatable Fast Loader: Now you can fast load all your 1581 files with this super quick fast loader.
- Partition Creator: Open partitions easily with this simple to operate utility. Even a novice can use it.

And as if this weren't enough, included with each toolkit is our 1581 DOS Reference Manual. Over 100 pages of valuable inside information on your 1581 disk drive. Written by David Martin (INFO magazine's Copy Corner reviewer), this manual represents about a year of investigation and research results. Also included with your 1581 TOOLKIT is a variety of handy utilities, including an M/L monitor with Drive Mon, written especially for the 1581 DOS Reference Guide. We could go on and on, but the sooner you order the 1581 TOOLKIT, the sooner you'll experience the finest!

The 1581 TOOLKIT (on 3½" diskette) and 1581 DOS REFERENCE GUIDE

Only $39.95

ATTENTION C-128 OWNERS

Now that Commodore has released the C-128D with 64K of video RAM, we should be seeing 128 programs address this fantastic new feature soon.

BASIC 8 already has the capability of using all 64K of video RAM. If you own the C-128 in stock condition, you own all 16K of video RAM that Commodore felt was necessary. Using Basic 8 format and the full 64K of video RAM provides you with the ability to scroll through video memory as well as enhanced color resolution.

Up until now, to upgrade the C-128 to 64K of video RAM you would have to first search out the components, then find a competent repair outlet to desolder and install the parts. **What a hassle!**

SOLUTION — We have developed a module that simply plugs in to the mother board of your C-128. **No splattered solder — No heat damage — No hassle.**

This package includes full easy to follow installation instructions, a test program to validate proper installation and the plug-in upgrade module.

Only $44.95

EDUCATIONAL SOFTWARE

CBS:		**Learning Company:**		Easy as ABC	13.97
Multiplication/Division	14.95	Gertrude's Secrets	24.97	Piece of Cake Math	21.97
Binomial Multiplication	14.95	Magic Spells	24.97	**Unicorn:**	
Linear Equations	14.95	Reader Rabbit	24.97	Decimal Dungeon	18.97
Davidson:		Rocky's Boots	30.97	Fraction Action	18.97
Algeblaster	30.97	**Random House:**		Percentage Panic	18.97
Math Blaster	30.97	Charlie Brown ABC's	9.97	Race Car Rithmetic	18.97
Spell It	30.97	Peanuts Maze Marathon	9.97	Ten Little Robots	18.97
Word Attack	30.97	Peanuts Picture Puzzler	9.97	**Weekly Reader:**	
Designware:		Snoopy to the Rescue	9.97	Stickybear ABC's	18.97
Body Transparent	18.97	Snoopy's Writer	9.97	Stickybear Math 1 or 2	18.97
Designasaurus	21.97	Snoopy's Reading Machine	9.97	Stickybear Numbers	18.97
European Nations & Loc	18.97	Snoopy Sky Scrambler	9.97	Stickybear Opposites	18.97
Mission Algebra	18.97	Typing is a Ball Charlie	9.97	Stickybear Reading	18.97
Spellicopter	18.97	**Springboard:**		Stickybear Spellgrabber	18.97
Spellagraph	18.97	Early Games-Young Children	21.97	Stickybear Typing	18.97
				Stickybear Vocabulary	18.97

ALL NEW

ATTENTION: SUPER SNAPSHOT OWNERS!

Now, you can expand the capabilities of your Super Snapshot cartridge. If you program in BASIC, you'll love the Eprom we have just for you. We have reprogrammed SYSRES, the classic BASIC programmer's tool to fit into your Super Snapshot Cartridge. No soldering or tools required. Just lift out the Super Snapshot Eprom and pop in Sysres. Instant access is yours. Sysres adds over 25 major commands to BASIC, and the extended DOS wedge is a pleasure to use. We even include a 1541/71 compatable fast loader, and an M/L monitor accessable from BASIC.

Your SYSRES package includes over one hundred pages of detailed documentation, and a disk based program, as well as an Eprom for your Super Snapshot Cartridge.

SYSRES - Still only $39.95

STOCKING STUFFERS (While They Last)

Amnesia	6.95	Educator	4.95	Panzer Grenadier	5.95
Arcade Four Pack	5.95	The Elementary Commodore 64	6.95	Personal Accountant CP/M	9.95
Bureaucracy 128	9.95	Entertainer	4.95	Personal Inventory CP/M	9.95
Candy Bandits	4.95	File & Report-Better Work	7.95	Pharoah's Curse	4.95
Castle Wolfenstein	5.95	Gamemaker Sports Library	4.95	Rocky Horror Show	6.95
Check Ease 64	4.95	Geos v1.2	9.95	Sanxion	6.95
Computer Trivia	4.95	Heart of Africa	5.95	Shamus II	4.95
Creative Filer	8.95	Kitchen Manager	4.95	Space Sentinal	4.95
Creative Writer	8.95	Leather Goddess	9.95	Suspended	7.95
Dan Dare	6.95	Money Savers I	4.95	Titanic	6.95
Delta Patrol	6.95	Money Savers II	4.95	Trinity 128	9.95
Desk Manager 64/128	8.95	Norway '85	5.95	World's Greatest Baseball	5.95

ALL NEW

KRACKER JAX REVEALED III

We've done it again!

Serious Commodore Users know why the Revealed Books by Kracker Jax are the last word in Commodore copy de-protection information. Our Knowledge of protection schemes has made us famous. Now find out how we do what we do best. Our books are your key to real knowledge. OTHERS ONLY SCRATCH THE SURFACE. We dig deep, much deeper. Not for the novice user, Kracker Jax Revealed Volume III takes you deep into the 1541 disk drive, where today's copy protection resides. If you have read and mastered the techniques set forth in Revealed I and II, you're ready for the next step - Kracker Jax Revealed III. Included as a free bonus is The Hacker's Utility Kit, one of the finest set of disk utilities gathered together in one package.

REVEALED BOOK III with Hacker's Utility Kit . . $23.50
REVEALED BOOK II with Hesmon Cartridge . . . $23.50
REVEALED BOOK I with Reset Board $23.50

SOFTWARE SUPPORT INTERNATIONAL

Circle #198 on Reader Service Card

Ordering is simple: We accept money orders, certified checks, personal checks (of previous Software Support customers), VISA, M/C, Discover, and COD. Orders shipped to U.S.A., F.P.O., A.P.O., Canada, or Mexico, please add $3.00 per order for shipping and handling. COD available to U.S. customers only: add $2.25 additional per order. Foreign customers must call or write for exact shipping charges. Defective items are replaced at no charge IF and only IF you call for a Return Authorization Number. All in stock orders are processed within 24 hours. U.S. Shipping is by UPS ground in most cases. FAST 2nd DAY AIR available: add $1.00 per pound additional (U.S. 48 states only). U.S. software orders over 100 dollars will be shipped 2nd Day Air at our regular $3.00 S/H charge. Washington residents please add 7.5% additional for Sales Tax. All prices subject to change.

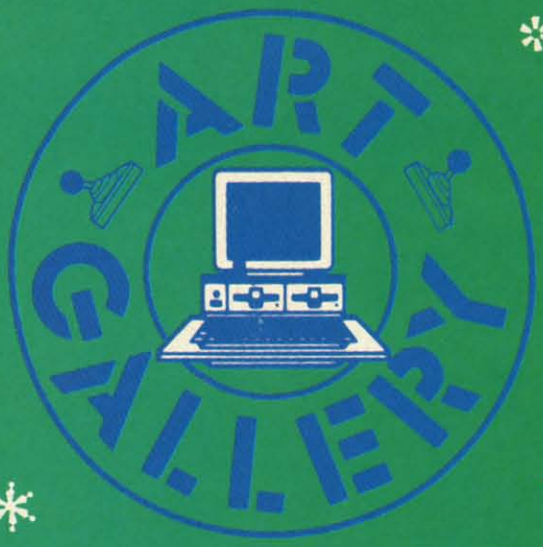
Program Submissions Invited
Need more info? Call or write for our free catalog.

Mail your order to: Software Support Int.
2700 NE Andresen Road / Vancouver, WA 98661

Or call our toll-free order line at 1-800-356-1179, 9am-5pm Pacific time Monday-Friday.
After hours orders accepted at (206) 695-9648 7 days a week.
Technical support available. Call (206) 695-9648, 9am-5pm Pacific time, Monday-Friday.

VISA MasterCard DISCOVER

DEALERS — WE HAVE THE SUPPORT YOU'RE LOOKING FOR!





The *Art Gallery* offers the opportunity for fame and fortune to aspiring Commodore artists. Send your work on disk to *Art Gallery,* Ion International Inc., 45 West 34th Street—Suite 500, New York, NY 10001. Label each disk with the date of your submission, your name and address, the number of images on the disk, and the graphics or paint program used. Graphics produced on the Amiga are eligible for inclusion in *Ahoy!'s AmigaUser;* C-64, C-128, and Plus/4 images are eligible for inclusion in *Ahoy!* If your image is published, you will receive a free one-year subscription. Current subscribers will have their subscription extended by one year.

Note that the *Art Gallery* is not a contest. Published pictures are selected in an arbitrary and capricious fashion by the Art Director, based solely on their artistic merit.







For the average person, Christmas or Chanukah means just the usual round of presents, celebrations, and time off from work or school. But *Ahoy!* readers have something really special to look forward to: the annual holiday edition of the *Art Gallery*. Above is *Reindeer* by Jason Anderson (Independence, MO), created on *Supersketch*. Top right: *Winter Sunset* by John A. Skilba (Lemont, IL), drawn on *The Artist*. Middle right: *Santa's Sack,* also by Jason Anderson. Bottom right: *Winter Hills* by Peter Leontescu (Bronx, NY), on *Koala*. Better start cleaning that chimney!

FLOTSAM

Send your comments on any aspect of Commodore computing to *Flotsam*, c/o *Ahoy!*, 45 West 34th Street—Suite 500, New York, NY 10001. We can print only a few letters, but we individually answer as many as we can—and we read every one.

I have a very strong feeling that I've purchased your magazine for the last time with the July 1988 issue. I've been buying your magazine each month since January 1986, but the issue I refer to left me with a sour taste in my mouth.

In your *Art Gallery* section for that issue, devoted to images related to American Independence Day, you show an illustration of a Canadian post office. You observe: "True, it's a Canadian post office. But where would our neighbors north of the border be without the American Revolution? Still trapping furs, no doubt, and trading them to us for three-cornered hats and powdered wigs."

Perhaps the author meant to be humorous. Well, I see nothing funny in his comments. I am a Canadian, and proud of it, just like the author is an American and proud of it. The author insinuated that we north of the border are living in the past. May I remind you that Commodore started in Toronto, Ontario; *Transactor*, a recognized Commodore publication, is based here; and important industry figures like Steve Punter (developer of the telecommunications protocol that bears his name) and Steven Douglas (author of *PaperClip)* are also Canadian-born.

We, your Canadian neighbors, are not the poor country bumpkins that your author would have your US readers believe. —Wayne D. Anderson
Greenwood, Nova Scotia, Canada

We're sorry you were offended by our remark. We certainly didn't mean to imply that Canadians were living in the eighteenth century, and we're at a loss to understand how you managed to make that inference from the passage quoted. Rest assured that we've always thought of our primary audience as North America—never as the United States alone.

Continued on page 31

SUBSCRIBE TO

Ahoy!'s
AmigaUser

Making space beside your 64 or 128 for a new Amiga? You'll want to make space for *Ahoy!'s AmigaUser* as well. It's put together by the same staff that brings you *Ahoy!*, with the same careful attention to the needs of the serious home computerist.

Use the coupon below to order a sample copy, or to subscribe at special money-saving rates.



Enter my subscription to *Ahoy!'s AmigaUser* for:
☐ One Year (12 issues) for $27.95 (Outside US $36.95)
☐ Two Years (24 issues) for $48.95 (Outside US $63.95)
☐ Send me the latest issue of *Ahoy!'s AmigaUser.* Enclosed is $4.50 (Outside US $5.50).
☐ Payment enclosed: $_____ ☐ Please bill me.
☐ MasterCard ☐ VISA Card # _____ Exp. Date_____
Signature_____
Name_____
Address_____
City_____State_____Zip_____
Send coupon or facsimile to *Ahoy!'s AmigaUser*, Ion International Inc., 45 West 34th Street—Suite 500, New York, NY 10001.

TIPS AHOY!

Compiled by Michael R. Davila

Send your best programming and hardware hints to *Tips Ahoy!*, c/o Ion International, 45 W. 34th St.–Suite 500, NY, NY 10001. Include a stamped and self-addressed envelope.

RASTER LINE

This program creates a reverse white line at the top of the screen like the one of many word processors.

If the user doesn't want to scroll the characters in this line, he can change with zero the byte at location $D011; in this way the line will be clean.

Now to write something in this line the user must POKE the first 40 bytes of the screen memory ($0400).

–Genco Ludovico
Mola di Bari, Italy

```
•140 FORJ=828TO903:READX:POKEJ,X
•150 CS=CS+X:NEXT
•160 IFCS<>8431THENPRINT"ERROR!":END
•170 PRINT"S":SYS828
•200 DATA120,169,91,141,20,3,169,3
•210 DATA141,21,3,169,50,141,18,208
•220 DATA173,17,208,41,127,141,17,208
•230 DATA169,129,141,26,208,88,96,173
•240 DATA25,208,141,25,208,48,7,173
•250 DATA13,220,88,76,49,234,173,18
•260 DATA208,201,58,176,10,169,1,141
•270 DATA33,208,169,58,76,130,3,169
•280 DATA0,141,33,208,169,50,141,18
•290 DATA208,76,188,254
```

CUP OF BOOLEAN

A Boolean expression, named for the logician George Boole, is often called a logical expression. These expressions only have a value of TRUE or FALSE.

Whether you know it or not, the Commodore computer has a built-in type of Boolean expression. Instead of values TRUE and FALSE, we use a one to represent TRUE and a zero to represent FALSE.

Type in and run the program below. The prompts are self-explanatory. After all questions have been answered, you will be shown whether two variables contain the same thing or not. This is acknowledged by a printed TRUE or FALSE.

Another way to view this program, would be to add the following lines:

```
IF NAMEBOOLEAN THEN PRINT"TRUE":GOTO 19
18 PRINT"FALSE"
20 IF AGEBOOLEAN THEN PRINT"TRUE":END
21 PRINT"FALSE"
```

where NAMEBOOLEAN and AGEBOOLEAN are TRUE only if they contain the value of one. –Michael Jaecks
Alamogordo, NM

```
•0 DIM BOOLEAN$(1):BOOLEAN$(0)="FALSE":BO
 OLEAN$(1)="TRUE"
•1 RV$=CHR$(18):RO$=CHR$(146)
•2 PRINTCHR$(147);:INPUT"ENTER YOUR NAME"
 ;N$:INPUT"ENTER YOUR AGE";A
•3 PRINT:INPUT"ENTER ANOTHER NAME";N1$:IN
 PUT"ENTER ANOTHER AGE";A1
•4 REM
•5 REM LINE 9 ASSIGNS A BOOLEAN VALUE
•6 REM OF ZERO FOR FALSE OR ONE FOR
•7 REM TRUE TO THE VARIABLE NAMEBOOLEAN
•8 REM
•9 NAMEBOOLEAN=ABS(N$=N1$)
•10 REM
•11 REM LINE 15 ASIGNS A BOOLEAN VALUE
•12 REM OF ZERO FOR FALSE OR ONE FOR
•13 REM TRUE TO THE VARIABLE AGEBOOLEAN
•14 REM
•15 AGEBOOLEAN=ABS(A=A1)
•16 PRINT:PRINT"TRUE OR FALSE?":PRINTRV$;
 N$;RO$;" IS THE SAME AS ";RV$;N1$
•17 PRINT BOOLEAN$(NAMEBOOLEAN)
•18 PRINT:PRINT"TRUE OR FALSE?":PRINTRV$;
 A;RO$;" IS THE SAME AS ";RV$;A1
•19 PRINT BOOLEAN$(AGEBOOLEAN)
```

DMA REMEDIES

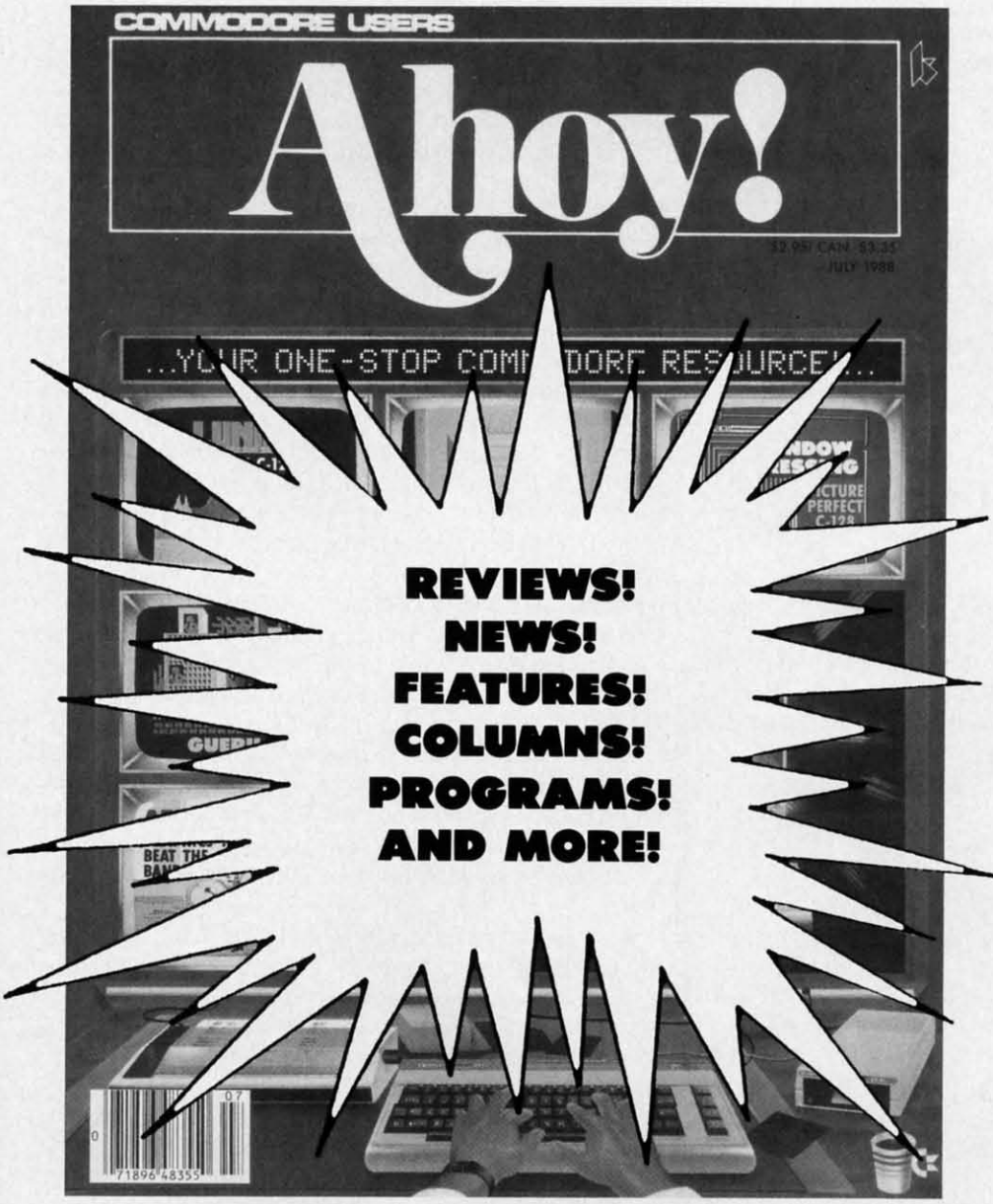
Available for the C-128 are the 1700 128K and 1750 512K RAM Expansion Units (REU). The C-128 comes equipped with the three easy to use statements, STASH, FETCH, and SWAP which operate on the REU. But there are some problems with these commands.

Problem one is that the C-128's 8502 microprocessor must be in SLOW (1 mhz) mode before the DMA command is issued. If the C-128 is in FAST (2 mhz) mode when the DMA command is issued, the system will lock up. This problem can be avoided by using a SLOW command immediately before the DMA command and a FAST command immediately after. However, this is the responsibility of the programmer.

Problem two is that if the 40 column display and FAST mode are being used, then the solution to problem one will cause the 40 column screen to flicker while the DMA takes place.

Problem three is that the next to the last routine involved with these DMA commands, located in ROM, contains a bug. It first gets the memory configuration data for the last used BANK command. If no BANK command has been used, then the bank used is bank 15. This memory configuration data which is correct up to this point is ANDed with $FE (254) which forces the 4K I/O block to be switched in between $D000 and $DFFF (53248 to 57343)

SUBSCRIBE TO



"You don't have to sell me on *Ahoy!* But why should I subscribe when I can pick it up at the newsstand?"

Here Are a Few Good Reasons:

1. You SAVE 33% off the newsstand price when you subscribe for two years (16 issues) for $31.95. That's under $2.00 an issue! Single year subscribers do almost as well—28% off the newsstand price. You'll do even better if you subscribe to the *Ahoy!* Disk Magazine—disk and magazine packaged together—over $30 off the yearly newsstand price!

2. You're certain never to miss an issue of your favorite Commodore magazine—crammed from cover to cover with C-64 and 128 news, reviews, articles, and programs! (But we forget—you know that already!)

3. You can enjoy the privileges of the *Ahoy!* Access Club, including monthly discounts from mail order advertisers and retailers around North America.

Convinced? Then fill out the postpaid card bound between pages 50 and 51 and return it today! (If someone beat you to it, use the coupon here.)

Enter my subscription to *Ahoy!*
☐ One Year (8 issues) $16.95
(Outside US $22.95)
☐ Two Years (16 issues) $31.95
(Outside US $42.95)

Enter my subscription to the *Ahoy! Disk Magazine*
☐ One Year (8 issues) $65.00
(Outside US $90.00)
☐ Two Years (16 issues) $120.00
(Outside US $160.00)

☐ Payment enclosed: $_____ ☐ Please bill me.
☐ MasterCard ☐ VISA Card #_____ Exp. Date_____
Signature_____
Name_____
Address_____
City_____ State_____ Zip_____

Send coupon or facsimile to: *Ahoy!*, P.O. Box 341, Mt. Morris, IL 61054-9925

in all cases. While this is necessary on the C-64 it is *not* necessary on the C-128. Forcing the I/O block in makes it impossible to use a DMA command on this area of RAM in banks 0 and 1. If you wish to move this area of memory to the REU, TOUGH LUCK!

The following machine language routine loaded by a BASIC loader routine solves all of these problems.

```
·1000 DMA=1008: JMP=76: ADR=2816: HI=INT(
ADR/256):LO=ADR-(HI*256)
·1010 POKE DMA,JMP: POKE DMA+1,LO: POKE D
MA+2,HI
·1020 BYTES=26: REM NUMBER OF BYTES IN DM
A REPLACEMENT ROUTINE
·1030 FOR LD=0 TO BYTES-1
·1040 :  READ ML: POKE ADR+LD,ML
·1050 NEXT LD
·1060 NEW: REM ERASE LOADER ROUTINE
·1070 REM DATA REPLACEMENT DATA
·1080 DATA 173,48,208,72,169,0,141,48,208
·1090 DATA 174,213,3,32,107,255,174,0,255
·1100 DATA 32,243,3,104,141,48,208,96
```

The starting location of the DMA issuer routine located is $3F0 (1008). The BASIC loader routine replaces the first instruction LDX $FF00 of the original DMA issuer routine with JMP $0B00. The replacement routine will be located in the cassette buffer. The JMP instruction redirects *any* call to this routine to the replacement routine.

In the replacement routine the A register is loaded from $D030 (53296) which determines the speed of the 8502. If this byte contains a 1 then the 8502 will operate in FAST mode. If this byte contains a 0 then the 8502 will operate in SLOW mode. The speed of the 8502 is pushed onto the stack, then a 0 byte is stored to $D030, forcing SLOW mode. Location $3D5 holds the bank number from the last used BANK command. The X register is loaded from here and a call is made to the kernal routine at $FF6B which returns the memory configuration data for the chosen bank in the A register. The X register is loaded from $FF00, the current memory configuration data which will be restored later when the DMA transfer is complete. Then the old DMA routine is called at location $3F3, three bytes past the original starting location. The Y register which remains untouched throughout the execution of the new DMA routine contains the DMA command itself. The Y register is stored to $DF01 which is the DMA command register in the I/O block. At this point bank 15 is still switched in. The A register which contains the memory configuration data for the DMA transfer is stored to $FF00 and DMA transfer takes place. Then the X register which contains the memory configuration data from before the DMA command was issued is stored back to $FF00 and a return is made back to the replacement routine which pulls the processor's speed from the stack and stores it back to D030 and returns control to BASIC.

The replacement routine relieves the programmer of the responsibility of insuring the C-128 is in SLOW mode before the DMA, prevents screen flicker when using FAST mode with the 40 column screen and permits the use of DMA commands on RAM from $D000 to $DFFF in banks 0 and 1.

It should be noted that a STASH, FETCH, or SWAP should always be preceded by a BANK 0 or a BANK 1 command to prevent accidentally overwriting the I/O register if this area of memory is involved in the DMA. Otherwise the system will lock up on a FETCH or SWAP on the I/O registers.

The replacement DMA routine is completely relocatable. If you wish to relocate it, just change the value of ADR to the address in memory where you will be placing the routine. Before I forget, this replacement routine allows the assembly and machine language programmer to freely use the C-128's DMA CALL routine at $FF50 on the RAM beneath the I/O block with no problems at all.

—Eric Schneider
Florissant, MO

COMPUTED GOTO/GOSUB

For the C-128 owner, here's a short ML routine that provides computed GOTO/GOSUB capability. Rather than being limited to actual line numbers, such expressions as GOTO.N, GOTO.1000+A*X, GOSUB.L(J), and GOSUB. VAL(A$) are provided. The decimal point is required before the expression, otherwise a SYNTAX ERROR results. It will not be considered part of any math that follows.

Continued on page 57



ALSOFT

RACE ANALYSIS SYSTEMS III

PROVEN HANDICAPPING SOFTWARE FOR THE COMMODORE COMPUTER. INCLUDES WINNING METHODS FOR HARNESS, THOROUGHBRED, AND GREYHOUND RACING.

ONLY $49.95

ALSOFT • BOX 164 • DEPT. M • CLAIRTON, PA 15025
PHONE (412) 233-4659

Circle #216 on Reader Service Card

COMMODARES
PROGRAMMING CHALLENGES

By Dale Rupert

Each month, we'll present several challenges designed to stimulate your synapses and toggle the bits in your cerebral random access memory. We invite you to send your solutions to:

Commodares, c/o *Ahoy!*
P.O. Box 723
Bethel, CT 06801

We will print and discuss the cleverest, simplest, shortest, most interesting and/or most unusual solutions. Be sure to identify the *name* and *number* of the problems you are solving. Put *your* name and address on the listings as well. Show sample runs if possible. Briefly describe your solutions and tell what makes them unique or interesting, if they are. You must enclose a stamped, self-addressed envelope if you want any of your materials returned. Solutions received by the middle of the month shown on the magazine cover are most likely to be discussed, but you may send solutions and comments any time. Your original programming problems, suggestions, and ideas are equally welcome. The best ones will become *Commodares!*

PROBLEM #60-1: EIGHT QUEENS

This classic problem was suggested by Robert Woods (Sherwood, OR). He says it is a tough one. Let your computer find all 92 arrangements of 8 queens on a chess board for which no queen can attack any other. The chess board is 8 by 8. A queen can attack any piece on her own row, column, or diagonal in any direction. Solution #1 is displayed like this:

```
COLUMN:  1 2 3 4 5 6 7 8
ROW:     1 5 8 6 3 7 2 4
```

Rob's solution takes 35 minutes with printouts. Can you do better?

PROBLEM #60-2: UNSTRING COMMAND

In contrast to the Instring (INSTR) function which locates the first occurrence of a given character within a string, this problem requires you to implement an UNSTRING routine identifies the first position within a string which does *not* contain the given target character.

For example, if the given string is "AAAABAA" and the target character is "A", the UNSTRING routine returns 5, since the 5th character is not an "A". If the target is any other character than "A" in this example, UNSTRING returns 1, indicating that the first character does not match the target. If the given string is "AAA" and the target character is "A", UNSTRING returns 0 since every character in the given string is the target character.

PROBLEM #60-3: $10,000 SERIES

The New York Times (8/30/88) described a numerical series for which the famous mathematician John Conway offered a $10,000 reward for anyone who could determine a particular property of the series. Two weeks after this offer was made, another well-respected mathematician, Colin Mallows, found the answer (with the help of a Cray supercomputer, his wife, and another colleague). Dr. Conway had intended to offer $1000, but his videotaped lecture revealed that he had in fact offered $10,000, so that is what he paid. Dr. Mallows agreed to the $1000 payment, although he kept the $10,000 check for framing.

Your task is to write a program to generate this otherwise obscure series. It starts out like this:

1, 1, 2, 2, 3, 4, 4, 4, 5, 6, ...

The rules for generating the next term in the series are:

1. Take the last term of the series (6 for the portion of the series shown above) and use it as a counter value CV. Count that many numbers back to the left (counting the last term as #1). That brings us to the 3.

2. Start at the beginning of the series and count forward CV terms (6 terms in our example). That brings us to the first 4.

3. Add the results of steps 1 and 2 and write the sum as the next number in the series. Here 3 plus 4 is 7 which is the next term in the series.

PROBLEM #60-4: ROMAN-ARABIC II

Richard van Frank (Montclair, NJ) suggested this *Commodare* which we have previously done. Newcomers will enjoy it, and old-timers may find a better way of solving it the second time around. The user enters a Roman numeral from I to MMMCMXCIX and the computer returns the corresponding Arabic value from 1 to 3999.

This month we will discuss the best solutions to *Commodares* from the July 1988 issue of *Ahoy!* *Problem #55-1: Sig Digs* was submitted by Jim Speers (Niles, MI). The overall challenge was to accept any integer from 0 to 65535 and determine the numbers of 1's, significant 0's, and SIGnificant DIGits altogether in the integer's binary representation.

Jim challenged the readers to perform this feat in a one-line program. This short program from Robert Clark (Ocean Springss, MS) *almost* does the job:

```
·1 REM ================================
·2 REM    COMMODARES PROBLEM #55-1 :
·3 REM       SIG DIGS
·4 REM    SOLUTION BY
·5 REM       ROBERT CLARK
·6 REM ================================
·7 INPUTN:FORE=15TO0STEP-1:V=2[UPARROW]E:
 F=V<=N:N=N+V*F:U=U-F:S=S+(S=0)*F*(E+1):N
 EXT:PRINTU,S-U,S
```

In fact many readers took a similar approach, although not as concise as Robert's program. This program works for most integers, but not all. The problem is with the value 2 raised to the 15th power. The number 55201 has the binary representation

1101 0111 1010 0001

for which the program should respond with 9 1's, 7 significant 0's, and 16 significant digits in all. Unfortunately most solutions submitted (including Robert's above) gave 8 1's and 8 significant 0's. Two raised to the 15th power is 32768.0001 in Commodore BASIC, and that extra ten-thousandth causes trouble.

This program from Jan Sorensen (Brockville, ONT) uses the INT function and gives the right answer for all integers:

```
·1 REM ================================
·2 REM    COMMODARES PROBLEM #55-1 :
·3 REM       SIG DIGS
·4 REM    SOLUTION BY
·5 REM       JAN SORENSEN
·6 REM ======= C-128 ONLY ==============
·10 INPUT"INPUT INTEGER";N
·20 A=INT(N/2): IF A=N/2 THEN X=X+1: ELSE
  Y=Y+1
·30 N=A: IF N>0 THEN 20
·40 PRINT "1'S ="Y; "0'S ="X, "SIG DIGS =
 "X+Y
```

C-64 users may modify this solution to eliminate the ELSE statement. You may change line 20 to this:

```
20 A=INT(N/2): Y=Y+1: IF A=N/2 THEN X=X+
1: Y=Y-1
```

These statements assume that Y (the number of 1's) will be incremented. If X should have been incremented instead, then Y must also be decremented. Notice that Jan's solution does not use the exponentiation function. In general, avoid that function whenever possible. Exponentiation is slow and prone to round off errors that are sometimes significant. Be careful when you use it.

Thanks to Joshua Tempkin (Roanoke, VA) for his analysis of this problem. Joshua's solution below uses exponentiation, but the INT function takes care of its inaccuracy.

```
·1 REM ================================
·2 REM    COMMODARES PROBLEM #55-1 :
·3 REM       SIG DIGS
·4 REM    SOLUTION BY
·5 REM       JOSHUA TEMPKIN
·6 REM ================================
·10 INPUT"ENTER INTEGER FROM 0 - 53687091
 1";NM: IF NM<0 OR NM>536870911 THEN 10
·20 X=NM: S=0: N0=0: N1=0: I=29
·30 DO UNTIL I=0
·40 I=I-1: K=INT(2[UPARROW]I): IF X>=K TH
 EN N1=N1+1: S=1: X=X-K: ELSE N0=N0+1: IF
  S=0 THEN N0=N0-1
·50 LOOP
·60 NT=N0+N1: PRINT"NUMBER OF 1'S, SIG 0'
 S, SIG DIGS:": PRINT N1,N0,NT
```

Notice that Joshua's solution allow integers up to 536,870,911 (2 ↑ 29) since numbers that large are stored exactly in the computer.

You may modify this program to display the binary representation of the given number. In line 40 add PRINT "1";: before the ELSE statement and add PRINT "0";: before the second IF. Also add PRINT: at the start of line 60. C-64 users must rewrite the program to eliminate the DO UNTIL, LOOP, and ELSE statements.

Problem #55-2: Rapid Randomizer was submitted by Justin Smalley (Boulder, CO). The problem was to add line 30 to a program which rearranges a given 100-element ar-

FREE CATALOG

- Enjoy High-Quality, low cost commercial software
- Over 2000 Programs: GAMES, EDUCATIONAL, MUSIC, GRAPHICS, HOME, BUSINESS & TECHNICAL

SOFTWARE $2 to $9

- The average price of a program is under $3.00
- DISK COLLECTIONS AVAILABLE AT A 40% SAVINGS
- HIGH QUALITY FOR LESS! WHY PAY MORE?

FREE DEMO DISK

- To demonstrate the EXCELLENT QUALITY of REMSOFT'S programs including: ZERO ZAP, COLOR MAGIC, SUPER YAHTZEE, HOME SECRETARY, PAC MATH, GEOMETRIC, INVESTMENT AIDS, SUPER MONOPOLY etc.
- This Demo Disk is VALUED OVER $20

CHECK ONE: ☐ Commodore 64® ☐ Commodore 128™
Send $3.00 for Handling & 1st Class Postage

Name _____ (please print)

Address _____

City _____ State ____ Zip _____

A **REMSOFT** P.O. BOX 2249 CAMARILLO, CA 93011

Circle #211 on Reader Service Card

ray in random order, as quickly as possible.

This solution from Jim Borden (Carlisle, PA) is almost the fastest.

```
·1 REM ================================
·2 REM    COMMODARES PROBLEM #55-2 :
·3 REM       RAPID RANDOMIZER
·4 REM    SOLUTION BY
·5 REM       JIM BORDEN
·6 REM ================================
·10 N=100: DIM X(N): FOR I=1 TO N: X(I)=I
 : NEXT
·20 T0=TI
·30 FORX=1TON:I=RND(1)*N+1:T=X(X):X(X)=X(
 I):X(I)=T:NEXT
·40 PRINT TI-T0"JIFFIES"
·50 FOR I=1 TO N:PRINT X(I);:NEXT
```

Jim's solution runs in 89 jiffies on my C-128 in FAST mode. Jim's program works by taking the elements of the array one at a time and swapping each one with a randomly selected element. After the 100th element has been swapped, the array should be in reasonably random order.

Looking at Jim's program, you might be hard pressed to make it any faster. In fact Doug Ropp (Phoenix, AZ) used an interesting twist to knock off a few more jiffies. His program listed here runs in 81 jiffies on my machine.

```
·1 REM ================================
·2 REM    COMMODARES PROBLEM #55-2 :
·3 REM       RAPID RANDOMIZER
·4 REM    SOLUTION BY
·5 REM       DOUG ROPP
·6 REM ================================
·10 N=100: DIM X(N): FOR I=1 TO N: X(I)=I
 : NEXT
·20 T0=TI
·30 X(0)=X(N):FORI=0TON-1:N=RND(N)*I:J=X(
 I):X(I)=X(N):X(N)=J:NEXT:N=I:X(N)=X(0)
·40 PRINT TI-T0"JIFFIES"
·50 FOR I=1 TO N:PRINT X(I);:NEXT
```

Doug (and many other readers) used periods instead of the 0's in line 30. I replaced them with 0's and found no speed difference in this application, so I left them. I really dislike seeing RND(.) instead of RND(0). Yes, I know that Commodore BASIC accepts it, and it does shave fractions of jiffies from certain applications. But in my opinion it is an obscure, non-standard, and just plain *cheap* programming practice.

So what did Doug do to gain the speed? He first moved X(100) to X(0). Now the range of random numbers needed is from 0 to 99 instead of 1 to 100. Consequently Doug's program does not need to add 1 to the calculated random number each time. Once the randomization is done, Doug's program restores N (in case this routine will be used again within another program), and it moves X(0) back up to X(100). Very clever indeed.

Now for *Problem #55-3: Unjumbled Words,* suggested by Eddie Byrd (Ste. Genevieve, MO). Eddie wanted to see every permutation of the letters of any given 5- or 6-letter word. I hinted that anyone with a good set of back issues of *Ahoy!* should be able to solve this one.

Wallace Leeker (Lemay, MO) dug through his collection and pulled out the April 1986 issue in which we discussed an algorithm used by Allan Flippin (San Jose, CA) to solve *Problem #24-1: Printing Permutations.* Wallace gives credit to Allan in his solution to this problem:

```
·1 REM ================================
·2 REM    COMMODARES PROBLEM #55-3 :
·3 REM       UNJUMBLED WORDS
·4 REM    SOLUTION BY
·5 REM       WALLACE LEEKER
·6 REM    (BASED ON A SOLUTION TO
·7 REM   PROBLEM #24-1 BY ALLAN FLIPPIN)
·8 REM ================================
·100 INPUT S$: N=LEN(S$): DIM C(N-1)
·110 I=N-1: PRINT S$,
·120 S$=LEFT$(S$,I-1)+RIGHT$(S$,N-I)+MID$
 (S$,I,1)
·130 C(I)=C(I)+1: IF C(I)<=N-I GOTO 110
·140 C(I)=0: IF I>1 THEN I=I-1: GOTO 120
```

Wallace modified Allan's solution so that it could handle letters instead of the numbers in the original problem. This is a very quick program. It handles words of any length.

BIG BLUE READER 128/64
COMMODORE <=> IBM PC
File Transfer Utility

Big Blue Reader 128/64 is ideal for those who use IBM PC compatible MS-DOS computers at work and have the Commodore 128 or 64 at home.

Big Blue Reader 128/64 is not an IBM PC emulator, but rather it is a quick and easy to use file transfer program designed to transfer word processing, text and ASCII files between two entirely different disk formats; Commodore and IBM MS-DOS. *Both C128 and C64 applications are on the same disk and requires either the 1571 and/or 1581 disk drive.* (Transfer 160K-360K 5.25 inch & 720K 3.5 inch MS-DOS disk files.)

Big Blue Reader 128 supports: C128 CP/M files, 17xx RAM exp, 40 and 80 column modes.

Big Blue Reader 64 Version 2 is 1571 and 1581 compatible and is available separately for only $29.95!

BIG BLUE READER 128/64 only $44.95

Order by check, money order, or C.O.D.
No credit card orders please. Foreign orders add $4
BBR 128/64 available to current BBR users for $18 plus your original disk.
Free shipping and handling. CALL or WRITE for more information.



To order Call or Write:
SOGWAP Software
115 Bellmont Rd
Decatur, IN 46733
Ph (219) 724-3900

Circle #200 on Reader Service Card

It is much better than the more traditional solutions to this problem which use loops within loops to pick all the permutations.

The program is deceptively simple. You should "play computer" to see just how it steps through the character positions to build every possible string from the given string. Those jumbled word puzzles just won't be the same with this program available. Wallace suggests tying the output of this program into a spell-checker. That way only "real" words would be displayed. (Aren't back issues wonderful?)

The final challenge this month is *Problem #55-4: Polar Graphics* from Thomson Fung (San Diego, CA). You'll love some of the impressive graphics this problem produces. The problem is to write a program which plots a graph of the equation

```
R = 10 * T * COS(T) * SIN(T)
```

in polar coordinates. R is the distance of each point from the origin (0,0). T is the angle of a line from the origin to the given point.

All the solutions were for the C-128 or for the C-64 with Simons' BASIC or a comparable language with graphics capabilities. The solution requires the value of T to be incremented, the new value of R to be calculated from the formula, and then the Cartesian coordinates X and Y to be determined from R and T. The formulas for X and Y are very simple:

```
X = R * COS(T)
Y = R * SIN(T)
```

Wallace Leeker sent four variations on his solution:

```
·1 REM ================================
·2 REM    COMMODARES PROBLEM #55-4 :
·3 REM      POLAR GRAPHICS
·4 REM    SOLUTION BY
·5 REM      WALLACE LEEKER
·6 REM ================================
·10 GRAPHIC 1,1
·20 FOR T=0 TO 25.2 STEP .1
·30 R=10*T*COS(T)*SIN(T)
·40 X=INT(R*COS(T))+160
·50 Y=INT(R*SIN(T))+100
·60 DRAW 1,X,Y:NEXT T
```

This version plots individual dots at each (R,T) or (X,Y) position. The added 160 and 100 in lines 40 and 50 shift the origin to the middle of the screen. The result is a "Spirograph" type of butterfly pattern.

In one of his variations on this solution, Wa
line 60 to

```
60 DRAW 1,X,Y TO 160,100 : NEXT T
```

This generates rays outward from the origin. Another variation used these lines:

```
60 DRAW 1,X,Y TO X2,Y2
70 X2=X: Y2=Y: NEXT T
```

This solution produces smoother, curved lines. You should have fun trying other variations.

This solution from Jim Borden lets you specify the range and step size of T:

```
·1 REM ================================
·2 REM    COMMODARES PROBLEM #55-4 :
·3 REM      POLAR GRAPHICS
·4 REM    SOLUTION BY
·5 REM      JIM BORDEN
·6 REM ================================
·10 INPUT "START ANGLE, END ANGLE (RADS),
 STEP";SA,EA,SP
·20 GRAPHIC 1,1: FOR T=SA TO EA STEP SP:
 R=10*T*SIN(T)*COS(T)
·30 X=SIN(T)*R: Y=COS(T)*R: DRAW 1,X+160,
 Y+99
·40 NEXT: GETKEY A$: GRAPHIC CLR: IF A$<>
 "Q" GOTO 10
```

Use 0, 25.2, and .1 to get the same results as Wallace's program. Change the formula for R to get other types of patterns. Notice that pressing any key except "Q" will restart Jim's program.

C-64 users must implement a routine to plot the X and Y values given in the DRAW statements of these programs. Once again, back issues may come to your rescue. *Rupert Reports* in the June and July 1985 issues of *Ahoy!* provide usable pixel plotting routines.

That's it for this month. Keep those problems and solutions coming. Have fun with this month's challenges. □

The following readers not already mentioned sent valid solutions this month:

Ed Balow (Calumet City, IL)
Miguel Borges (St. John's, Newfoundland)
John Desclin (Brussels, Belgium)
George Gaudette (Lakeland, FL)
Keith Kushner (Brooklyn, NY)
H.G. Langston (Kissimmee, FL)
E. Lindsey
William Pfister (Camden, NY)
Norman Richards (Angleton, TX)
Larry Shafer (Westphalia, MI)
David Shobe (Lawrence, KS)
Richard van Frank (Montclair, NJ)
Rob Woods (Sherwood, OR)

For more information on products or services advertised or mentioned in *Ahoy!*, circle the corresponding Reader Service Number on the card bound between pages 50 and 51.

FLOTSAM

Continued from page 23

This is being written to you from the other side of the earth. Kangaroo Island is 70 miles south of Adelaide in South Australia. The island is quite large—160 miles long by 60 miles wide, supporting about 4000 people.

I would like to thank you for a fine computer magazine. I have been a regular reader for the past 18 months and find that your programs are good.

I have two C-64s and two 1541s, one fitted with a Flash and one without. I have found the C-64 to be the most economical of all computers (though very slow, except when using the Flash). The C-128D is the most versatile I've used, though its 64 mode does not load the 100% of C-64 programs that we are led to believe. The CP/M mode is its most interesting aspect—it is unique in that it recognizes six other disk formats and shows the disk name and identification on the screen, and I've been able to copy public domain software from these other disks.

Your article in the March 1988 *Ahoy!* (we get our issues about two months late) on surge suppression was most interesting. Surge suppression arrived in South Australia this year in the form of a four-outlet power board which takes care of small surges in the power circuit, whether caused by the power supply or by light electrical equipment. However, major surges (or spikes) caused by refrigerators, air conditioners, pressure pumps, and the like override the power board, causing the computer to reset. The only thing I've found to control this type of surge is my printer (an Epson GX80 Commodore-compatible); when it's powered up, it absorbs the surge, protecting the computer and the program I'm working on.

—Bill Jordan
Penneshaw K.I., South Australia

Here's a good one for Commodares *(if not for Ripley's Believe It Or Not): what are the odds against our receiving two letters in two consecutive months from Kangaroo Island, South Australia? That's just what happened—with Murray Hansen's letter printed last month, followed by the above. Any more Kangaroo Islanders out there who'd like to make it three in a row?*

I recently cancelled my subscription to another computer magazine because they stopped publishing type-in programs. I own a C-64 and enjoy typing in your programs. Please keep *Ahoy!* the way it is, except for returning it to a 12 issue per year schedule.

—J. Revis
Bark River, MD

No one would like to see Ahoy! *return to monthly publication more than we. However, no such change is likely in the near future. Still, you should find some consolation in knowing that publishing fewer issues enables us to publish better issues. With 8 magazines to fill yearly instead of 12, we're able to include only the best of the best of the programs and articles we receive. Also, the extra time allows us to fine-tune each magazine to an extent that would not otherwise be possible.*



Excellence ...

for the Commodore

Lt. Kernal - a 20 or 40 Megabyte Hard Drive which supports CP/M, includes enhanced system commands, and is expandable, configurable, & *FAST!* Great for BBS operation.

Super Graphix GOLD - the ultimate printer interface which supports 128 FAST serial and includes a 32K buffer, 4 built-in fonts, 4 downloadable fonts, and a utility disk with 27 fonts.

Super Graphix - an enhanced printer interface which has NLQ built-in and includes an 8K buffer, 2 downloadable fonts, reset button, and a utility disk with 27 fonts.

Super Graphix jr - an economical printer interface with NLQ built-in and includes 10 printing modes, graphics, and easy operation.

FontMaster II - a powerful wordprocessor for the C64 with 30 fonts ready to use, 65 commands, font creator, data merging, super and subscripting, italicizing and more.

FontMaster 128 - a super wordprocessor for the 128 with 56 fonts ready to use including foreign language fonts, on screen font preview, 4 column printing, a 102,000 word spell checker and much more.

The ***Xetec*** Product Family for the Commodore C64® and 128®

The name that spells *Quality, Affordability,* and *Reliability*

All Hardware is FCC Certified All Interfaces include a Lifetime Warranty

Commodore C64 and 128 are registered trademarks of Commodore Business Machines, Inc.

Xetec, Inc. 2804 Arnold Rd. Salina, KS. 67401 (913) 827-0685

Circle #221 on Reader Service Card



Adrift in a Sea of Floating Point Numbers

The Computer's Internal Mathematical Structure



By Dale Rupert

PHOTOGRAPHY © CHRISTOPHER GOULD 1988

RUPERT REPORT

The largest value your computer allows is the rather unusual number 1.70141183E+38. The smallest positive number that is distinguishable from 0 in the computer is 2.93873588E−39. How did the designers of the computer come up with these strange values?

We have discussed how integers are stored in the computer, but what about decimal fractions and numbers written in scientific notation? Why does the computer say that the square root of 36 does not equal 6 even though it displays both values as "6" on the screen?

To answer these questions and many more, we will dip into the complicated and confusing world of floating point numbers. When we are done, you will be able to better appreciate one of the most important and complex parts of the BASIC language.

Just to see that there is more to numbers in the computer than meets the eye, type these statements in direct mode:

```
A=6: B=SQR(36): PRINT A,B: IF A<>B THEN
PRINT "A AND B ARE NOT EQUAL"
```

The computer shows "6" for the values of A and B, but it also concludes that A and B are not equal. If we look into the way that A and B are stored, this is what we see:

```
A: 131 64 0 0 0
B: 131 64 0 0 1
```

Clearly A and B are different inside the computer. But how do we interpret this strange format where the simple number "6" is stored in five bytes as "131 64 0 0 0"?

STRANGE FORMAT

All numbers assigned to numeric (non-integer) variables in BASIC are stored in a floating point format which might be described as "4-byte normalized mantissa with two's complement most significant bit and 1-byte excess-128 exponent." If that rather scary-sounding bunch of terminology bothers you, a simplified example of floating point number storage will show that there is nothing to worry about.

Start with a number written in standard scientific notation: 4×10^3. This quantity may be expressed in BASIC as 4E3, 0.4E4, 40E2, or in various other ways, all equivalent to the number 4000. "E" stands for the words "times ten raised to the power." One way to interpreting "E" is to think "move the decimal point over this many places." To evaluate 0.4E4 for example, write 0.4 as 0.40000 (use as many 0s as you want), then move the decimal point four places to the right, giving 4000.0.

The number following the "E" is called the "exponent" and the number preceding the "E" is called the "mantissa." The number 10 is called the "base."

Every real number can be expressed as a
mantissa times a *base* raised to an *exponent.*

It is convenient to adjust or "normalize" the mantissa to

CHECK US OUT! LET US EARN YOUR BUSINESS!!

☑ SERVICE ☑ SUPPORT ☑ SELECTION ☑ PRICES ☑ GUARANTEE

HOME/BUSINESS

Bankstreet Writer		$35
BEST Business Series 64	EA	45
Business Form Shop		30
CMS Accountant 128		129
CMS Inventory 128		53
Chartpak 128 OR 64	EA	29
Datamanager 128		39
Datamanager 2		17
Fleet Filer 64/128		29
Fleet System 2 +		39
Fleet System 4		52
Fontmaster 128 w/Spell		39
Fontmaster II		35
KFS Accountant 128		119
Add-ons - call us		52
Math Function Evaluator		27
Microlawyer 64		42
PPM 128		42
PPM 64		29
Page Builder 128		39
Paperclip Publisher 64		39
Paperclip 3		39
Partner 128		39
Partner 64		30
Pocket Dictionary		10
Pocket Superpak 2		67
Pocket Write/File or Plan 2	EA	39
Securities Analyist 128		35
Superbase 128		49
Superbase 64		44
Superbase 128/1581 drive		**call
Swiftcalc 128 w/Sideways		39
Swiftcalc 64		17
TAS 128		42
TAS 64		29
Timeworks Business Series	EA	39
Vizistar 128		60
Vizlwrite Classic 128		60
Wordwriter 128		39
Wordwriter 3		30

EDUCATIONAL

Body Transparent		22
Early Learning Friends/PRE		6
Facemaker/PRE		18
Galactic Frontier		22
Kindercomp/PRE		18
Stickybear ABC's/PRE		22
Stickybear Numbers/PRE		22
Stickybear Shapes/PRE		22
Alphabet Zoo/5-8		18

EDUCATIONAL

Easy Sign/5 +		$17
Grandma's House/5-9		6
Kids on Keys/5-8		18
Linkword Foreign Languages	EA	19
Little Computer People		$1
Peter Rabbit (Reading 1) / 5-8		19
Reader Rabbit/4-7		29
Rocky's Boots/9 +		29
Stickybear Math 1/5-8		22
Stickybear Reading/5-8		22
Stickybear Typing/5-8		22
Jungle Book (Reading 2) / 6-9		19
Kidwriter/6-9		22
Mathbusters/6-9		9
Stickybear Math 2/6-9		22
Stickybear Spellgrabber/6-9		22
Stickybear Townbuilder/6-9		22
First Men on Moon Math/9 +		19
Stickybear Read Compreh./9 +		22
Evelyn Wood Dynamic Read/11 +		17
Pro Tutor Accounting/14 +		69
R.S.V.P. / 12 +		21
Ticket to London, Paris, Span OR Washington/12 +	EA	21
Where USA Carmen		35
Where World Carmen		35
Widham Clasics / 10 + Alice In Wonderland, Swiss Family Robinson, Below The Root, Treasure Island OR Wizard of OZ	EA	12

PERSONAL

Bodylog Cardio Exercise		75
Bodylog Enhanced Stress		229
Bodylog Heartlab		49
Bodylog Muscle Development		54
Bodylog Standard Stress		89
Boston Bartender's Guide		12
Bridgemaster		12
Build a Book About You		19
CDA Cooking Titles		call
Crossword		12
Dr. Ruth's Sex		22
Dream Machine		19
Family Tree 128 OR 64	EA	39
Paul Whitehead Chess		25
RSVP		21
Sexual Edge		19
Tempo Typing		12

GEOS

Becker Basic		$35
Fontpac Plus 64/128		35
GEOS 128		45
GEOS 64		39
GEOS Companion Number One		24
GeoFile 64		35
GeoProgrammer		45
GeoPublish 64		45
GeoSpell		19
Geocalc 128		45
Geocalc 64		35
Geofile 128		45
Geowrite Workshop 128		45
Geowrite Workshop 64		35
Neofont		19
Word Publisher (GEOS)		28

GRAPHICS/CAD

3D Perspective 2		39
Advanced OCP Art Studio		25
Animation Station		65
BASIC 3		25
Billboard Maker		29
Blazing Paddles		25
Bumper Sticker Maker		35
Business Card Maker		35
CAD 3D		39
Cadpak 128		42
Cadpak 64		29
Certificate Maker		17
Colorez 128		12
Doodle!		29
Flexidraw 5.5		29
Geopublish 64		45
Graphic Art Disks 1 thru 10	EA	13
Graphic Label Wizard		21
Graphics Galleria Pak 1 OR 2	EA	24
Graphics Integrator 2		24
Graphics Transformer		25
Home Designer 128		45
ICON Factory		25
Moving Pictures		20
Newsroom		17
PCB Circuit Board Maker		79
Page Illustrator 128		29
Paperclip Publisher 64		39
Photo Finish		19
PrintMaster Plus		25
Printshop		35
Screen F/X		25
Slideshow Creator		13
The Toy Shop		22
Video Title Shop		25

AIDS/UTILITIES

1541/1571 Drive Alignment		$25
BASIC 8		30
BASIC Compiler 128		42
BASIC Compiler 64		29
Big Blue Reader 64/128		32
Bobsterm Pro 128		42
Bobsterm Pro 64		35
CPM Kit 128		22
COBOL 128 OR COBOL 64	EA	29
Final Cartridge 3		49
Gnome Kit 64/128		29
Mach 128		35
Merlin 128		45
Merlin 64		35
Physical Exam 1541 OR 1571		29
Power Assembler 64/128		30
Power C 64/128		30
Proto Linc BBS 128		45
RAM DOS 128		29
Renegade		29
Super 81 Utilities 128 or 64		29
Super Aide		25
Super C 128 OR 64		45
Super Chips 64		25
Super Chips 128 or 128D		45
Super Disk Utilities		25
Super Librarian 128		19
Super Pascal 128 OR 64	EA	45
Syntech BBS Construction Set		43
Syntech BBS Games Module		18
Sysres Enhanced		30
Warp Speed 128		35
Kracker Jax Volumes 1-4	EA	10
Kracker Jax Volumes 5-7	EA	17
Loaded Gun 2		17
Super Snapshot V3		49
Super Snapshot V3 w/C128 Disk		54

BOOKS

Abacus Books	call
Big Tip Book for Commodore	15
C128 Programmer Ref. Guide	22
C128 Subroutine Library	15
GEOS Prog Ref Guide 2	17
K Jax Revealed Book 1	23
K Jax Revealed Book 2	23
Superbase the Book	15
Troubleshoot & Repair C64	18

MISCELLANEOUS

2-for-1 Serial Box		29
4-for-1 Serial Box		39

MISCELLANEOUS

C64 OR 1541 Cover	EA	7
C128 OR 1571 Cover	EA	9
40/80 Column Switch Cable		18
AB Printer Switch Box		35
Aprospan Cartridge Holder		$27
Drive Box		27
Hotshot Plus Printer Interf.		69
Lightpen 170C		69
Lightpen 184C		49
M3 Proportional Mouse		40
Mousepad		8
Partner 128		39
Partner 64		29
Print & Wear Transfer Paper		17
Quick Brown Box - 32K		79
Quick Brown Box - 64K		99
RGB to TV Cable		9
RS232 Interface Cable		39
Printer Paper		**call
Printer Ribbons		**call
Serial Cable - 6 Foot		9
Super Graphix Gold		89

BRiWALL

Solid Products • Solid Support

P.O. Box 129, 56 Noble St.
Kutztown, PA 19530

TOLL-FREE 24 HOURS
1-800-638-5757

OUR PROMISE
WE GUARANTEE YOUR SATISFACTION

If, for any reason, you are not satisfied with your selection within 15 days of your receipt, simply return the product to us. We will either issue you full credit for exchange on another selection, or refund your purchase price, less $5.00 for restocking and handling. Defective items are replaced free of charge!

Great Products By Free Spirit Software Inc.

1541/1571 Drive Alignment

1541/1571 Drive Alignment reports the alignment condition of the disk drive as you perform adjustments. On screen help is available while the program is running. Includes features for speed adjustment and stop adjustment. Complete instruction manual on aligning both 1541 and 1571 drives. Even includes instructions on how to load alignment program when nothing else will load! Works on the C64, SX64, C128 in either 64 or 128 mode, 1541, 1571 in either 1541 or 1571 mode! Autoboots to all modes. Second drive fully supported. Program disk, calibration disk and instruction manual. only **$25.00**

Super 81 Utilities now available for the C64!

Super 81 Utilities is a complete utilities package for the 1581 disk drive and C128 computer. Among the many Super 81 Utilities features are:

- Copy whole disks from 1541 or 1571 format to 1581 partitions
- Copy 1541 or 1571 files to 1581 disks
- Copy 1581 files to 1571 disks
- Backup 1581 disks or files with 1 or 2 1581's
- 1581 Disk Editor, Drive Monitor, RAM Writer
- Supplied on both 3½" and 5¼" diskettes so that it will load on either the 1571 or 1581 drive
- Perform many CP/M and MS-DOS utility functions
- perform numerous DOS functions such as rename a disk, rename a file, scratch or unscratch files, lock or unlock files, create auto-boot and much more!

SUPER 81 UTILITIES

Super 81 Utilities uses an option window to display all choices available at any given time. A full featured disk utilities system for the 1581. only **$29.00**

RAMDOS RAMDOS is a complete RAM based "Disk" Operating System for the Commodore 1700 and 1750 RAM expansion modules which turns all or part of the expansion memory into a lighting fast RAM-DISK. RAMDOS behaves similar to a much faster 1541 or 1571 floppy disk except that the data is held in expansion RAM and not on disk. Under RAMDOS, a 50K program can be loaded in ½ second. Programs and files can be transferred to and from disk with a single command. RAMDOS is available for only **$29.00**

PROFESSIONAL CAD FOR YOUR COMMODORE 128!

HOME DESIGNER

This is the most powerful two-dimensional CAD program available for your C128! As an object-based package (this is what the professionals use) your drawings are created and printed with the **greatest accuracy and detail possible.** This object-based design provides extreme flexibility and control over your drawings because each line, circle, text-string, etc. can be manipulated (rotated, enlarged, erased) as a separate entity. **With over 50 powerful commands,** you can translate, rotate and mirror objects. Stretch or shorten lines as needed. Easily create parallel lines. Draw or erase arcs, circles, ellipses and boxes at will. Insert library figures anywhere into drawings at any scale and angle. Scale text to any height and width. Work in either an absolute scale or feet/inches. Your drawing screen (a 16" by 22" page) includes **5 drawing layers** that can be selected/included/excluded/erased at will. HOME DESIGNER provides **accurate, lazer-quality output, at ANY scale, on your dot matrix printer or plotter.** Use a joystick or the 1351 mouse as input.

WHEN THE DETAILS ARE IMPORTANT! **Still only $45.00**

THE WRITE STUFF

WRITER & TALKER

This WORDPROCESSOR is by far one of the BEST that we have seen! Let's get right to the specs: 21 function calculator - line up numbers with the decimal tab; 60 customizable help screens - 86K of disk doc's; Double-column printing in one pass; Encyrpt/decrypt text; Sort up to ten columns (great for lists); Merge/Append text files; Link files; Word/paragraph counter; File translator for 15 other W/P's; Dvorak [- -] QWERTY toggle; True 80 column Hi-Res preview; Key-click for typewriter sound; Mail Merge; Automatic Case; On-line clock; 1764 RAM Expander support; MACRO TYPING cuts your typing time by over 25% and more!

The WRITE STUFF even comes in a TALKING version, which includes SAM, a program that produces speech from your computer's sound capabilities. This BB TALKER recites any portion of your text, can say each letter and command as it is typed, and translates to phonetic script for additional editing. **Great for the sight-impaired and the youngsters!!**

C64 version - $19.00 C128 version - $24.00 C64 w/Talker - $24.00

FREE CATALOG

40 pages of detailed descriptions for over 300 fine products for your Commodore computer

CALL OR WRITE FOR YOUR COPY TODAY!

$$$$$$$$

COLLECT BONUS DOLLARS

One bonus dollar, good towards your next purchase, for every $50.00 ordered!

COLLECT THRU 8/31/88

USE THRU 12/31/88

CALL FOR LATEST PRODUCTS, PRICES AND COMBINATION SPECIALS!

ORDERING INSTRUCTIONS: VISA, MasterCard, Personal Check, Money Order or COD are welcome. Shipping USA: $3.50/ground, $5.50/2nd Day, $14.00/overnight. C.O.D. add $3.00. Canada/Mexico: $6.00 Air Mail. Foreign: $12.00 (for Air Mail use charge & specify maximum). PA residents add 6% sales tax. Include phone number and computer/drive model with order. All items will be shipped immediately, (if we are out-of-stock, we will let you know.) **CHARGE IS PER ORDER.**

For CUSTOMER SERVICE please call us:
Monday thru Friday, 9:30 a.m. - 4 p.m. EST
1 - (215) - 683-5699

VISA MasterCard NO SURCHARGE

be a decimal fraction greater than or equal to 0.1 and less than 1.0. The exponent can then be adjusted to compensate. For example, 4000 written in normalized form is 0.4E4 since the mantissa is between 0.1 and 1. Other forms such as 40E2, 400E1, and 4000E0 all have the same value, but they are unnormalized.

Here are some other values and their normalized floating point representation:

123 = 0.123E3	54.321 = 0.54321E2
0.5 = 0.5E0	6 = 0.6E1
0.05 = 0.5E−1	0.00064 = 0.64E−3

Notice that the last two examples have negative exponents. A negative exponent is interpreted as "move the decimal point to the *left* by this many places." Thus 0.64E−3 can be written 0000.64E−3 (add as many 0s as desired), and then "E−3" says to move the decimal point 3 places to the left, giving 0.00064.

Now we have seen that there is nothing very mystifying about the concepts of mantissa, base, exponent, and normalization. Is there any number that can't be written in this floating point format? If the exponent can be a number of any size, the answer is "No, any number can be written in floating point format."

Negative numbers are written with a negative mantissa. Don't confuse a negative mantissa (meaning "the number is less than 0") with a negative exponent (meaning "move the decimal point left").

The power of floating point representation is that a very wide range of values can be stored in a limited amount of space. Compare the number 1,000,000,000 with its normalized floating point equivalent of 0.1E6. Square that number to get 1,000,000,000,000 which can be expressed as a compact 0.1E12. Cube that result to get 1 followed by 36 zeros which can be shown tidily as 0.1E36.

For small numbers very close to zero, there is a similar storage advantage. The distance between circuit lines in the microcircuits of some computers is 2 microns (or less). This is 2 millionths of a meter written as 0.000 002 meter. In normalized floating point representation, this is a compact 0.2E−5.

Floating point notation is more powerful than "fixed point" notation. In fixed point notation, only a certain number of digits are allowed to the right of the decimal point. If that number is 2, for example, the quantity 123.2345 is stored as 123.23. Any digits beyond the second decimal digit are rounded off or truncated.

The disadvantage of fixed point storage is that the smallest positive number which can be represented is 0.01 (for 2-place fixed point format). Any smaller number such as 0.0032 becomes just 0.00. Floating point notation might limit the number of decimal digits to 2 also, but it is still able to represent very small values: 0.0032 could be stored as 0.32E−2.

BINARY REALM

We all know that computers store their information as binary numbers, using only 0s and 1s. Binary is another name for the "base 2" number system. It might be expected then that floating point storage in the computer uses a base of 2 rather than the base of 10 in the previous examples. In fact, that is true. Numbers are stored in the computer in normalized, base-2 format.

Probably most readers are already familiar with binary integers: 1101 in base 2 (written 1101_2) equals 13 in base 10, $11111111_2 = 255_{10}$, and so forth. Each digit corresponds to a certain power of 2 in the binary number system just as each digit corresponds to a power of 10 (its "place value") in a decimal number.

Just as we may think of the decimal number as "1 in the 1000's place + 5 in the 100's place + 0 in the 10's place + 4 in the 1's place," the binary number 1101 stands for "1 in the 8's place + 1 in the 4's place + 0 in the 2's place + 1 in the 1's place." Calculating (1*8 + 1*4 + 0*2 + 1*1) gives the decimal equivalent 13.

So much for whole numbers. What about fractions? How is the decimal fraction 0.5 represented as a binary number? Very simply, 0.5 in decimal = 0.1 in binary. Again it all depends upon place values. The first digit to the right of the decimal point in base ten represents tenths, the second digit represents hundredths, and so forth. In the binary system, the first digit to the right of the "binary point" (or "radix point" – the more general term) represents halves, the next digit is 4ths, the next is 8ths, then 16ths, and so on.

The binary fraction 0.1101 may be interpreted this way:

$$\begin{aligned} 0.1101_2 &= 1*(\tfrac{1}{2}) + 1*(\tfrac{1}{4}) + 0*(\tfrac{1}{8}) + 1*(1/16) \\ &= 0.5 + 0.25 + 0 + 0.0625 \\ &= 0.8125 \text{ in decimal} \end{aligned}$$

There is another way to convert a binary fraction into its decimal equivalent. Just as we might read the decimal fraction 0.058 as "58 thousandths", we could interpret the binary fraction 0.1101 as "13 sixteenths" since 1101_2 is 13 and the furthest digit to the right in 0.1101 is in the 16ths place. If we convert 13/16 into a decimal by dividing, we get the previous result 0.8125.

TAKE A BYTE

Not only is the computer binary-oriented, it is byte-oriented, where a byte is a group of 8 binary digits. Binary fractions in the computer are most easily handled in byte format. Consider the binary fraction 0.11010001. Again we could convert it to decimal bit by bit:

$$\begin{aligned} 0.11010001_2 &= 1*(\tfrac{1}{2}) + 1*(\tfrac{1}{4}) + 0*(\tfrac{1}{8}) + 1*(1/16) + \\ &0*(1/32) + 0*(1/64) + 0*(1/128) + 1*(1/256) \\ &= 0.81640625 \end{aligned}$$

Using the other method, take the binary integer 11010001 which is 209 in decimal. Divide it by 256 (since the bit furthest to the right in the original binary fraction is in the 256th's place) giving 209/256 or 0.81640625, just as above:

$$0.11010001_2 = 11010001_2 / 256 = 209/256 = 0.81640625$$

209 comes from the fact that the left-most bit in the byte is 128, so 11010001_2 equals 1*128 + 1*64 + 0*32 + 1*16 + 0*8 + 0*4 + 0*2 + 1*1 which is 209.

CONVERTING A FLOATING-POINT NUMBER INTO ITS INTERNALLY STORED FORMAT

Consider 10.234. Here is how to calculate the floating-point representation of this value.

1. Divide by 2 repeatedly until the quotient is between 0.1 and 1:

```
10.234 / 2 = 5.117
5.117 / 2 = 2.5585
2.5585 / 2 = 1.27925
1.27925 / 2 = 0.639625
```

Since this took 4 divisions, our exponent will be 4. Convert the exponent to excess-128 format:

```
Exponent = 4 + 128 = 132
```

2. Multiply the last quotient by 256:

```
0.639625 * 256 = 163.744
```

Take the integer part of this number (163) as the MSB of the mantissa. But first subtract 128 from it (since it is greater than or equal to 128 and since our original number 10.234 is positive):

```
Mantissa MSB = 163 - 128 = 35
```

3. Take the fractional part of the previous product (0.744) and multiply by 256:

```
0.744 * 256 = 190.464
```

The next MSB of the mantissa is the inteter part of this result:

```
Mantissa byte 2 = 190
```

4. Repeat Step 3 two more times to get the last two bytes of the mantissa:

```
0.464 * 256 = 118.784

Mantissa byte 3 = 118

0.784 * 256 = 200.704
```

Round this final value to the nearest integer (201) to get the least significant byte of the mantissa:

```
Mantissa LSB = 201
```

5. The number 10.234 will be stored in the computer as

```
132 35 190 118 201
```

You can verify this result with the program *Floating Point Converter.*

We need one more example before we see how all of this is related to floating point storage in BASIC. We saw that normalizing a decimal fraction meant moving the decimal point so that it was just to the left of the most significant digit of the mantissa. This movement was compensated by changing the size of the exponent. An analogous process is used to normalize a binary fraction.

Consider the decimal number 209. Here is how it could be represented as a normalized, binary floating point value:

1) Write 209 as a binary number times a power of 2:

```
209 = 11010001₂ * 2 ↑ 0 (since 2 ↑ 0 is 1)
    = 11010001.E0 (now E stands for "* 2 ↑")
```

2) Move the radix point to the left of the left-most non-zero bit (move it 8 places to the left):

```
.11010001
```

3) Compensate for that move by increasing the exponent by 8:

```
.11010001E8
```

To check our results, take the binary fraction 0.11010001 and multiply it by 2 ↑ 8. We saw earlier that 0.11010001 is 0.81640625 and we know that 2 ↑ 8 is 256. Sure enough, 0.81640625 * 256 = 209. Alternately 0.11010001 is 209/256, and 209/256 * 256 is 209. We lost nothing in translation.

INTO THE DEPTHS

If you have made it this far, the worst is behind. With an understanding of binary fractions and normalization, we can now look at numbers stored in floating point form in the computer.

We will discuss the program *Floating Point Converter* (see page 64). This program PEEKs at the data stored in a floating point variable so that we can see the computer's internal representation of any number. The program also allows you to put data values directly into memory and see how the computer interprets them as a floating point quantity.

The program looks into the memory location where the first variable defined in the program is stored. That memory location is found from the "start of variables pointer." This pointer is a 2-byte number stored at addresses 47 and 48 in the C-128 and at 45 and 46 in the C-64. Line 70 determines which computer is being used. Line 80 selects the proper value for the starting address of the pointer.

Line 90 converts the 2-byte pointer into a memory address using the standard formula:

```
Address = (pointer's lst byte) + 256*(pointer's 2nd byte)
```

This address is where the first variable of the program resides. Each variable is allocated 7 bytes of memory. The storage format for floating point variables looks like the chart at the top of the next column.

Each variable may have a 2 character name (only the first 2 characters are significant anyway). These characters are stored in Namel and Name2. If the variable has a single

character name, that character is stored in Name1 and 0 is stored in Name2.

Byte	Contents	Byte	Contents
1	Name1	5	Mant2
2	Name2	6	Mant3
3	Exponent	7	Mant4
4	Mant1		

The remaining 5 bytes are the exponent and mantissa of the variable's floating point value. Each byte may have a value from 0 to 255. The exponent is stored as an "excess 128" value which means very simply that 128 has been added to the actual value. The smallest exponent which can be represented here is −128 which is stored as the quantity 0. The largest exponent allowed is +127 which is stored as 255. Remember that these exponents are powers of 2.

The mantissa is normalized and stored as four bytes. There is just one more complication, however. Since the mantissa has been normalized (the radix point is shifted so it is just to the left of the left-most, non-zero bit), we know that the left-most bit is always a 1.

Here's where some *incredible* reasoning comes into play. Read carefully. We know that the exponent has been adjusted so that the left-most bit of the mantissa is always a 1, and therefore, (are you ready for this?) we don't actually need to store a 1 there in the left-most bit of the mantissa. In fact, that bit is used to indicate whether the mantissa is positive or negative.

If the mantissa is negative, a 1 is stored in the left-most bit. If the mantissa is positive, a 0 is stored in the left-most bit. Regardless of what is stored in the left-most bit, we know (at least the computer knows) the value of that bit is always a 1. By seeing what is actually stored for that bit, we also know the sign of the mantissa. Pretty neat, eh?

BACK TO THE PROGRAM

We now know how data is stored in floating point variables. Let's see how the program *Floating Point Converter* reads and displays the data. The exponent and 4 mantissa bytes for the variable X0 are at addresses S1 and S2 through S5. Line 260 PEEKs at those addresses (in BANK 1 for the C-128) to see the values stored there. The 5 bytes are stored in V1 through V5.

The routine at line 1010 prints those 5 bytes and interprets them. The exponent is calculated from V1 by subtracting the "excess 128" in line 1030. The mantissa is calculated from the other 4 bytes in line 1040. V2 stores the left-most byte of the mantissa. Remember that its left-most bit should always be 1. The statement (128 OR V2) sets the bit to 1 regardless of its actual value.

We have already seen that the first mantissa byte may be thought of as a number of 256ths. The second mantissa byte is in the $(1/256)^2$ position. Similarly the third and fourth mantissa bytes represent the number of $(1/256)^3$'s and $(1/256)^4$'s.

Line 1040 shows an efficient way to calculating the actual value of the mantissa. The least significant byte V5 is first divided by 256. The next least significant byte V4 is added, and the quantity is again divided by 256. Now V5 is effectively been divided by 256^2. Next V3 is added and the quantity is divided once more by 256. Finally the corrected most-significant mantissa byte V2 is added and the quantity is divided by 256.

You may do some algebraic tinkering to convince yourself that MN in line 1040 now stores the value:

$$\frac{V2}{256} + \frac{V3}{256^2} + \frac{V4}{256^3} + \frac{V5}{256^4}$$

This is analogous to our earlier example in binary where 0.1101_2 was converted to decimal by dividing each digit by its place value:

$$½ + ¼ + 0/8 + 1/16 = ½ + ½^2 + 0/2^3 + ½^4$$

Line 1050 determines the sign SN of the mantissa by checking the value of the most significant byte (MSB). The MSB of V2 is greater than or equal to 128 only if its most significant bit equals 1. Thus all negative mantissas have a value of V2 greater than or equal to 128, and all positive mantissas have V2 less than 128.

Line 1060 displays the calculated sign, mantissa, and exponent and then shows the actual value of the variable X0. The program does not actually perform the calculation of SN*MN*2 EX because multiplication and exponentiation round off errors limit the accuracy of the results. You may add the statements to display the results of that calculation

RENTING SOFTWARE ISN'T HARD!

It's as easy as picking up the phone and giving your order. If you have a credit card, it's even easier. The hardest part may be waiting for the mail to come!

We're having a special sale, with up to 80% off selected software. Call now for a complete list.

Call toll-free outside Texas: 1–800–433-2938
– Inside Texas call: 817–292-7396

WEDGWOOD RENTAL
5316 Woodway Drive
Fort Worth, Texas 76133

Circle #220 on Reader Service Card

if you like.

If you press X at the prompt, the program switches to the value entry mode. In this mode, you may specify the 5 bytes to be stored for the variable X0. The same routine at line 1010 then converts those values to exponent/mantissa format. You will see that slightly changing the 5th byte (V5) may not change the displayed value of X0. Several different internal values are all displayed the same way on the screen.

For example, let's see how SQR(36) differs from 6. Line 20 in the program defines X0 to be the square root of 36. If you just press the RETURN key the first time you run the program, X0 retains that value. The bytes stored for SQR(36) are shown to be:

131 64 0 0 1

Now enter 6 at the prompt and see that the number 6 is stored as:

131 64 0 0 0

A difference of 1 in the least significant byte is not significant for the screen display. When the computer compares 6 with SQR(36), however, the difference is significant.

Now press X to switch modes. Enter values 131, 64, 0, 0, 2. This quantity is displayed on the screen as 6.00000001. Experiment with other values and see how sensitive the displayed value is to changes in the internal values.

To wrap it all up, let's analyze the results of X0 equal to SQR(36) just to make sure you understand what is being shown by this program. Once again, the internal values for SQR(36) are 131, 64, 0, 0, 1. The exponent is 131 minus 128 which is 3. The MSB of the mantissa is 64 which is 0100 0000 in binary. Remember that the left-most bit of this byte is *assumed* to be 1. The fact that it is actually 0 means that we have a positive mantissa.

Change the left-most bit of this byte to 1 giving 1100 0000 which is 192 in decimal. Now calculate the mantissa using the displayed values from right to left:

$$\text{mantissa} = (((1/256 + 0)/256 + 0)/256 + 192)/256$$

or

$$\begin{aligned}\text{mantissa} &= 1/256^4 + 192/256 \\ &= 1/4294967296 + 192/256 \\ &= 0.750\ 000\ 000\ 233\end{aligned}$$

Next multiply this mantissa by 2 raised to the 3rd power:

$$\begin{aligned}\text{result} &= 0.750\ 000\ 000\ 233 * 2^3 \\ &= 6.000\ 000\ 001\ 86 \\ &= 6 \text{ (rounded to 9 significant figures)}\end{aligned}$$

Hopefully by experimenting with other numbers, you will better understand and more fully appreciate the internal mathematical structure of BASIC. Enter these values into the program to see why 1.70141183E38 is the largest allowed value, and 2.93873588E−39 is the smallest. The next time someone tells you that computers never make mistakes, show them our first example and explain why the computer thinks the square root of 36 does not equal 6. Computers can certainly *appear* to make mistakes if we don't recognize their limitations and don't understand their internal operations. □

SEE PROGRAM LISTING ON PAGE 64

CALLING ALL COMPUTER RETAILERS!

Would you like to:

- **Get free national advertising?**
- **Increase store traffic?**
- **Acquire the most avid Commodore computerists in your area as steady customers?**

Simply offer a 10% discount to members of the *Ahoy!* Access Club, comprised of all subscribers to *Ahoy!* and *Ahoy!'s AmigaUser* (see ad elsewhere in the magazine). We'll list your store name, address, and phone number in the *Clipper* (our monthly newsletter) and on the *Ahoy!* Access Club BBS. Then, the next time a member in your town wants to make a purchase, he'll pass your competitors by. (Unless, of course, your competitors are listed—in which case you'd *really* better be!)

If an across-the-board discount is not feasible for you, but you'd like to offer our members some other incentive to shop with you, write us. Space restrictions will prevent us from listing very many individualized offers, but if yours is significant enough to warrant the space, we'll include it.

The deadline for inclusion in the March '89 edition of the *Clipper* is November 29. Write or call now!

Ahoy! Access Club
c/o Ion International Inc.
45 West 34th Street—Suite 500
New York, NY 10001
Phone: 212-239-0855

Ahoy! Access

METROCROSS

Epyx
Commodore 64
Disk; $24.95

This jaunty 1985 Namco design features an imaginative obstacle course beneath an unnamed city. It's a race against time that should challenge even arcade aces.

The joystick or keyboard controls a commuter, depicted in modified side perspective. The animated cartoon figure leaps barriers, slides on the green slime tiles, and vaults over the rolling red cans as seconds tick away on the counter located below the active playfield.

If the commuter reaches the goalposts at the end of the horizontally scrolling subway tunnel before time elapses, the player advances to the next one. A cute sequence in which the character huffs and puffs after successfully completing a level also allows the computerist to get ready for the next, even more difficult round.

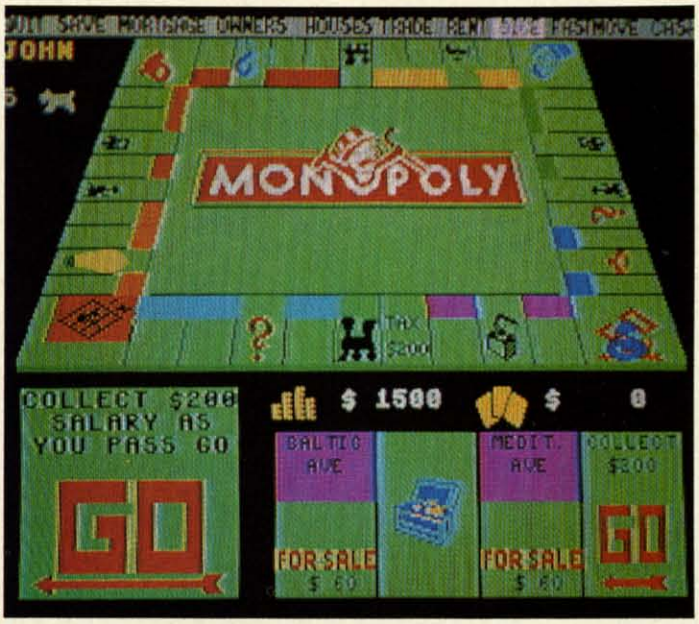


Metrocross *features an imaginative obstacle course under an unnamed city.*

The commuter gets help from several sources in the frantic footrace against the clock. Skateboards are a superior form of transportation, and the springboards offer the character a quick trip through the air.

Kicking a blue can earn a bonus score, but stomping one is an even better strategy. It temporarily stops the clock and gives the player two precious additional seconds.

Jumping on a green can has the same time-delaying effect, but kicking one increases the commuter's speed for five seconds. Sometimes, faster movement is worth more than the extra seconds.



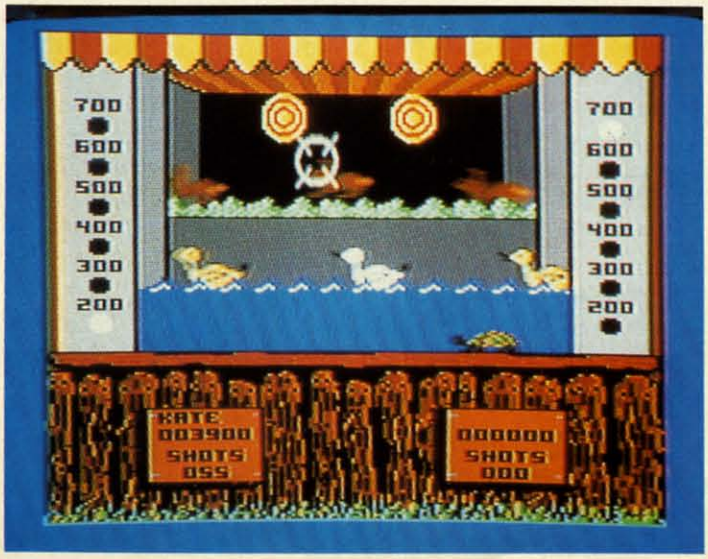
Computer **Monopoly** *is played just like the original, with the advantages of onscreen prompts to guide players through the game, and the computer's help in making money and real estate transactions.*

The logic of the situation is paper thin, but *Metrocross* is so much fun that most joystick jockeys won't care. The documentation doesn't really attempt to provide a rationale for all the cans and skateboards and surplus track and field hurdles. It's just as well. *Metrocross*, the first title in Epyx's new U.S. Gold line, is best enjoyed with a light heart and an empty mind.

The biggest objection, however, concerns the failure to adjust the game for the U.S. market. The only thing more frustrating than a "high score" screen which doesn't retain the computerist's best performances between sessions is a vanity board which permanently saves only the miscellaneous names and scores which the programmers coded into the product before purchase. I make no promises of good behavior if I run into "Brian" who is credited with a score of 100,000 on my disk.

Fine-tuning the increase in difficulty between levels is another change which would make *Metrocross* better for the home gaming audience. Adults may find it hard to make progress in this demanding action contest.

Those who can cope with the physical requirements are in for a treat. *Metrocross* will give your joystick or key-



Clubhouse Sports *simulates six arcade amusements from the pre-video-game era. The games attempt to reproduce what the gamer would see if he were actually playing these contests.*

board fingers a terrific workout.

Epyx, 600 Galveston Dr., P.O. Box 8020, Redwood City, CA 94063 (phone: 415-366-0606). *—Arnie Katz*

Circle #179 on Reader Service Card

MONOPOLY
Leisure Genius
Commodore 64
Disk; $29.95

America's most enduringly popular board game is *Monopoly.* It has literally enthralled the world since Parker Brothers purchased the rights in 1935. The board game is currently published in 29 countries and translated into 22 foreign languages. There's hardly a family that doesn't own a set; there are hardly any of us who don't fondly recall marathon playing sessions around the kitchen table.

Leisure Genius' computer edition of *Monopoly* recalls those family games with the same warmth of heart, then adds its own brand of ruthless gusto that would do everyone's Brother Ed proud. If you think the *Monopoly* players at your family gatherings were tough, just wait until you play against the computer!

Computer *Monopoly* is played exactly like the boardgame; there are no sacrifices or abridgements of the standard rules. Two to eight players can participate, and these can be all human, all computer, or any combination of humans and computer opponents. Regardless of the mix of players, the bank always takes over the money-changing details, including monitoring all property transactions.

Onscreen prompts guide the user through the game. After a handsome title screen and a view of the standard *Monopoly* board, the computerist enters the number and name of each player in the game, whether or not each position is managed by the computer, and then selects the playing tokens. These are the old familiar icons: flatiron, dog, motor car, thimble, shoe, hat, wheelbarrow, and cowboy.

Next the computerist either chooses to play the standard, full-length game, or sets a time limit for a shortened version.

Gamers control play with joystick, cursor keys, or keyboard. An option bar runs across the top of the screen, and by highlighting these commands, the gamer can quit, save the game, mortgage property, see what property is owned by each player, buy houses, collect rent, throw the dice, or show how much cash each player has. The final selection is Fastmove; use of this option speeds up each person's playing time.

Play is logical, and semi-automatic. Positions played by the computer are handled very speedily, almost too quickly for a human monitor to keep up. When a human competitor is on deck, action only proceeds when the player hits the RETURN key.

The name of the current player is displayed to the left of the full-sized board with a picture of the applicable token. The player moves the cursor along the option bar at the top of the screen to highlight Dice. This activates two nicely articulated dice, shown tumbling in the lower lefthand corner.

After the dice roll, the player's token scoots the proper number of spaces along the board before coming to rest in its new location. The four pieces of property surrounding the player's position are depicted full sized in the lower right corner, each with a banner across its face indicating if it's still for sale, sold, mortgaged, or has houses or hotels.

An onscreen prompt inquires if the player wants to buy the property, if it's available. If so, the computer automatically makes the sale, and takes care of the money and accounting chores. If the property belongs to one of the others, the onscreen prompt tells how much rent is owed and to whom, then deducts that amount of money from the player's stash. The amount of cash available for use and the property that player owns are also shown onscreen for instant reference.

Before the player surrenders the dice, he or she can offer trades, make loans, or develop property. When the player finishes the turn, highlighting Dice and pressing RETURN starts the next player's turn.

The graphics are extremely attractive, and help protect the old-fashioned feeling of *Monopoly.* The board, depicted in two-thirds perspective, is true to its origins. When each player's token comes to life and slides around the board, the trip is enhanced by pleasant sound effects, like the policeman's whistle, bells that chime when you pass Go, and locomotive sounds for each of the four railroads.

In fact, the only real flaw with the computer edition of *Monopoly* is that it doesn't come packed with live people, instead of its computer robot players. The computer plays a hard-hearted game, adhering strictly to the rules. Until you play a computerized game, you probably won't realize just how much of the fun of *Monopoly* comes from the family or group of friends. The game loses something if Little Sister isn't there wheedling her way into an overly generous loan from the bank, or if Cousin Earl isn't making an under-the-table arrangement with Uncle Buck to take over the world. Without the family fun, it's a cold game—and also a fairly quick one. If one human plays against several computerized opponents, the game races along at a breakneck speed, going through all of its phases with no human input, so that it's practically impossible to keep up with the action.

Monopoly is a wonderful game, and this computerized edition is a true and faithful rendition. No one who loves the game should be without this, since it provides a good way to get up a game, even when the kitchen is empty of family and friends. But, when the house fills up with familiar faces, the game should be moved back to the tabletop, for that's still the place where it's the most fun for everyone.

Leisure Genius/Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404 (phone: 415-571-7171). *—Joyce Worley*

Circle #178 on Reader Service Card

CLUBHOUSE SPORTS
Mindscape
Commodore 64
Disk; $29.95

Nobody gives computer game players value for their dollar like Ed Ringler. In 1987, Ed's DesignStar Consultants brought us the groundbreaking *Superstar Indoor Sports,* with its quartet of Air Hockey, Darts, Bowling, and Ping Pong simulations. Any of these smartly executed games might have been released on its own without a murmur of discontent from consumers, but DesignStar and Mindscape nobly opted to package the four into one of the most successful omnibus en-

Ahoy! DISK

Why type in the listings in this month's *Ahoy!* when we've done it for you? All the programs in this issue are available on the current *Ahoy! Disk* for $8.95. Isn't your time worth more than that?

Use the coupon at the bottom of this page to order disks for individual months, a disk subscription, or the special anthology disks described below. (You can also subscribe to the *Ahoy! Disk Magazine*—disk and magazine packaged together at a special reduced rate. See the card bound between pages 50 and 51.)

BEST OF '84
Address Book (3/84)
Air Assault (5/84)
Alpiner (6/84)
Checklist (7/84)
Construction Co. (12/84)
DOS (9/84)
Emerald Elephant (10/84)
I Got Biorhythm (5/84)
Lawn Job (10/84)
Lunar Lander (4/84)
Math Master (5/84)
Micro Minder (8/84)
Multi Draw 64 (1/84)
Name That Star (4/84)
Post Time (6/84)
Salvage Diver (9/84)
Space Lanes (VIC) (3/84)
Space Lanes (64) (3/84)
Space Patrol (12/84)
VIC 40 (10/84)

BEST OF '85
Ahoy! Dock (9/85)
Auto Line Numbers (3/85)
Directory Manipulator (12/85)
File Lock (9/85)
Fontasia (2/85)
Futurewar! (2/85)
Gameloader (12/85)
Home Budget (3/85)
Jewel Quest (12/85)
Lightning Loader (11/85)
Midprint (1/85)
Music Tutor (1/85)
Salmon Run (3/85)
Screen Dump (8/85)
Telelink (2/85)
Tile Time (5/85)

BEST OF '86
Disk Cataloger (8/86)
Dogcatcher (9/86)
Fidgits' Music School (7/86)
Flap! (8/86)
Guardian (11/86)
Head to Head (2/86)
Highlight (8/86)
JCALC (4/86)
Meteor Run (8/86)
Mine Canyon (9/86)
Mountaineer Mack (10/86)
Star Strike (6/86)
Step On It (8/86)
Syntax Patrol (9/86)
Teleporter (11/86)
Tenpins (11/86)
1541 Alignment Check (2/86)

BEST UTILITIES
Auto Append (7/85)
BASIC Trace (4/85)
Base Conversions (9/84)
Booter (4/85)
Commodore Font Editor (5/85)
DOS (9/84)
Fastnew (9/85)
Formatter (8/85)
Lucky Lottery (7/85)
Maestro (10/85)
Micro Minder (8/84)
Printat (7/85)
Screen Bit Dump (6/85)
Screen Magic (6/85)
Start & End File Address (9/85)
Two Column Directory (5/85)
Windows (8/85)
1541 Cleaning Utility (10/85)

BEST UTILITIES II
Alarm Clock (1/86)
BASIC Relocator (1/86)
Bigprint (5/86)
Chrono-Wedge (4/86)
Disk Checkup (10/86)
Failsafe (5/86)
Long Lines (11/86)
Programmer's Aid (3/86)
Quick Change (10/86)
Reversed Remarks (7/86)
Screen Sleuth (7/86)
Screen Window (4/86)
Speech64 (9/86)
The Editor (12/86)
Trackdown (6/86)
Very-Able (3/86)
128 to 64 Autoboot (10/86)

BEST GAMES
Alpiner (6/84)
Construction Co. (12/84)
Disintegrator (8/85)
Dragon Type (9/85)
Duck Shoot (6/85)
Emerald Elephant (10/84)
Gators N Snakes (8/85)
Gravinauts (10/85)
Lawn Job (10/84)
Mystery at Mycroft Mews (10/85)
Name That Star (4/84)
Post Time (6/84)
Salvage Diver (9/84)
Script Analysis (7/85)
Space Patrol (12/84)
Tile Time (5/85)
Wizard of Im (7/85)

BEST GAMES II
Actionauts (4/86)
Air Rescue (4/86)
Brickbusters (3/86)
Crabfight (2/86)
English Darts (5/86)
Got a Match? (6/86)
Haunted Castle (1/86)
Head On (7/86)
Knockout (1/86)
Micro City (12/86)
Minotaur Maze (12/86)
Penguins (10/86)
Ski Folly (5/86)
Star Search (5/86)
Swoop (4/86)
The Last Ninja (9/86)

BEST C-128
AhoyTerm (3/86)
Dark Fortress (1/87)
Dual Dump (9/86)
Extended Background Mode (4/87)
Infoflow (4/87)
List Formatter (4/87)
More BASIC 128 (2/87)
Nebergall Run (7/86)
Planet Duel (4/87)
Queen's and Bishop's Tours (6/86)
Rescue 128 (3/87)
The Artist (12/86)
Variable Manager (9/86)
Wordcount (7/86)
128 to 64 Autoboot (10/86)

We've collected Ahoy!'s best programs onto the Anthology Disks described here. Please note that many of these programs will be unusable without the documentation printed in the issues of Ahoy! listed in parentheses.

SINGLE ISSUE AND SUBSCRIPTION PRICES

(Postage and Handling Included)	U.S.A.	CANADA	ELSEWHERE
❑ December '88 *Ahoy!* Disk	$ 8.95	$ 12.95	$ 13.95
❑ 12-Month Disk Subscription	$ 79.95	$ 99.95	$124.95
❑ 24-Month Disk Subscription	$149.95	$179.95	–

BACK ISSUES $8.95

In Canada add $2.00 per issue; outside US and Canada add $4.00 per issue.

❑ ___	$8.95	❑ ___	$8.95
❑ ___	$8.95	❑ ___	$8.95
❑ ___	$8.95	❑ ___	$8.95
❑ ___	$8.95	❑ ___	$8.95

ANTHOLOGY DISKS $10.95 EACH

❑ Best of '84
❑ Best of '85
❑ Best of '86
❑ Best of C-128
❑ Best Utilities
❑ Best Utilities II
❑ Best Games
❑ Best Games II

Send coupon or facsimile to: ***Ahoy!* Program Disk**
Ion International Inc.
45 West 34th Street, Suite 500
New York, NY 10001

MC and VISA Accepted Call 718-979-9330

NAME_____

ADDRESS_____

CITY_____ **STATE**_____ **ZIP**_____

Make check or money order payable to **Double L Software**. N.Y. State Residents must add 8¼% sales tax.



Like some previous Datasoft titles, **Cosmic Relief** *mixes action with elements from role-playing adventures to form a new kind of entertainment that requires mental as well as physical dexterity.*



Stocker's *overhead view is like a blast from video/computer gaming's past.*

tertainment products ever.

This year's model is called *Clubhouse Sports* and includes an amazing *six* simulations of classic arcade amusements from the pre-videogame era: Pinball, Billiards, Skeeball, Shooting Gallery, Crazy Pool, and Foosball. Up to four players can compete in any or all of the contests, with top scores stored to memory on each game's vanity board.

As with *Indoor Sports*, the games of *Clubhouse Sports* share a visual orientation that attempts to reproduce what the gamer would see if he were actually playing these contests. Unfortunately, some of these games are not optimized by this viewpoint.

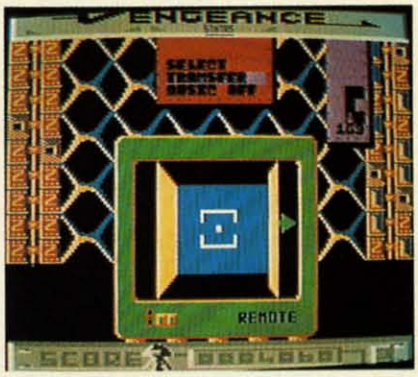
In Pinball the novelty of seeing the table from a true player's perspective does have appeal. It allows the user to realistically integrate tilting into the gameplay, for example. But before long the lack of an overhead view is sorely missed. This presentation limits the amount of space available for table graphics, resulting in a much too simple board. There are only *two* bumpers, both at the top of the table, and just one pair of flippers, where a second set was clearly called for.

The visually compelling display is full of compromises. The ball does not in any way suggest a pinball. When seen from the farthest point, at the top of the table, it resembles a ping pong ball. By the time it reaches the flipper area it has swollen to baseball size, giving the entire game an outsized, non-proportional look.

Continuity is a nice thing, and the conceit that we are in a computerized clubhouse, playing all the games from the same perspective, is very endearing. But it simply does not make sense to hammer a square peg into a round hole. Pinball should have been one of this package's hottest entries. Instead it plays like a clever idea that didn't pan out as a satisfying game.

The player's-eye-view perspective *does* work on Foosball, however, making this the surprise pick of the litter. Foosball is a form of table soccer in which two gamers manipulate a series of rods containing plastic players to make up six-man teams.

Clubhouse Sports' computer version of this neglected classic simplifies the one play element that could cause difficulty: alternating control from rod to rod. The potential problem is nicely sidestepped by having the computer automatically activate the appropriate rod depending on the position of the ball.

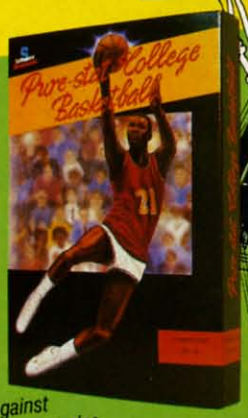


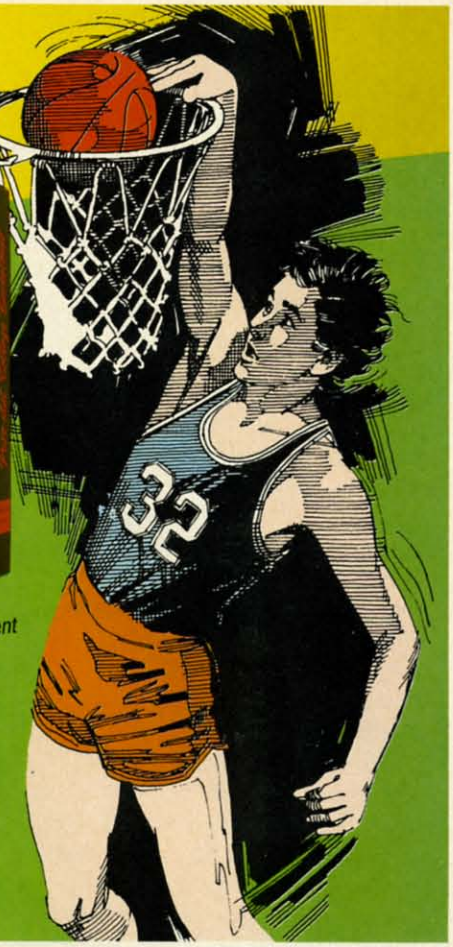
Alien Destruction Set *is four action games with a shared sci-fi theme.*



***In* Pool of Radiance** *as in other games, you create characters, form them into a party, and send them into the world to encounter monsters, magic, and treasure, whereby they rise in level and power.*

Pure-stat College Basketball





Authorities say that coaching ability makes the difference in college basketball: Can you coach a team to the final 4, or even the National Tournament? Now you can find out! From the authors of PURE-STAT BASEBALL comes PURE-STAT COLLEGE BASKETBALL.

This statistically based program contains 20 great college teams from the past and present. See all the plays animated on the screen with 5 on 5 full court action. Everything from a slam dunk to a fast break. Special features include: Man-to-Man or Zone defenses, the option to SLOW-DOWN the tempo of the game (allowing a weaker team to be competitive with a stronger one), or take a 3 point shot with current teams, fatigue factors are included for each player based on time played.

In PURE-STAT COLLEGE BASKETBALL you can play against an opponent, play against the computer, or let the computer play itself (great for tournament play). This program also includes a stat compiler which saves the results of the games played. This feature allows you to scout the opposition or evaluate your own team. If you feel you're up to the challenge, set up your own tournament and test your coaching skills. Will your team make it to the final 4?

See your local dealer, or contact:

An optional Tournament Disk and Create Team Disk are available.

Software Simulations
959 Main Street, Suite 204
Stratford, CT 06497
(203) 377-4339

PURE·STAT FOOTBALL



The authors of **Pure-Stat Baseball** and **Pure-Stat College Basketball** introduce their most precise simulation to date, **PURE-STAT FOOTBALL! This third generation** football game has a wide array of innovative features that include: Computer Coaching using artificial intelligence to select offensive/defensive plays, Vertical and Horizontal Scrolling of on-field action, a built-in Stat Compiler, and much more. PURE-STAT FOOTBALL will challenge even the most avid fan!

- For zero, one, or two players
- Statistically based program where Pro-Football players and teams perform as they did in real life
- Built-in Stat Compiler that includes League Standings
- Full screen graphics with 22 animated players (No X's and O's)
- Eight types of runs, 12 types of passes
  - *— Draw Plays, Reverses, Screen Passes*
  - *— Blitz Linebackers, Double Team Receivers*
  - *— Zone Defense, Prevent Defense*
  - *— Use Four Receivers, Insert a Fifth Defensive Back*
- Optional Team and Create Team Disks Available

Suggested retail price $39.95

Screens from Commodore 64™/128™ version of game.

See your local dealer, or contact:

Software Simulations
959 Main Street, Suite 204, Stratford, CT 06497
(203) 377-4339

Skeeball is the next best of the six entries. This venerable variation on bowling lets the player roll a ball down an alley with an upward tilt at its far end. This lip acts as a launch pad for the rolling ball which must attain some loft in order to hit the target: a series of segmented concentric circles with point values that increase toward the center.

The user has full access to a detailed series of player options. In Skeeball, the user can play solo, contest with a variably skilled computer opponent, play against the clock, or play with a preset number of balls. The ball is aimed with a cursor set to provide automatic resistance to the bullseye (the closer the cursor comes to center screen, the greater the force which pushes it away). This game works just fine, recreating the simplicity and fascination of this arcade favorite.

The shooting gallery, while no eye-popper, is a pleasant diversion. The user targets the pop-up ducks, bunnies, and bullseyes through a joystick-controlled crosshairs cursor and fires by pressing the action button. There are four levels of depth to this target gallery, ranging from the turtles creeping slowly along the bottom foreground to the flying ducks and drop-targets in the background.

The two pool table games, Billiards and Crazy Pool, are minor disappointments. Again, the viewpoint takes much of the blame. In both games, the table is seen from a two-thirds perspective with the short sides at the top and bottom of the screen. This unyielding viewpoint forces the player to set up every shot from the same position, which is simply *not* the way such games are played. As with Pinball, an overhead view would have made a lot of sense here.

Clubhouse Sports is a great value, make no mistake, but this collection is inferior to *Indoor Sports*. Some of the games in this newer package look like leftovers—ideas that didn't make the first cut and so showed up here hoping to find strength in numbers. It is recommended, but don't set your expectations too high.

Mindscape, 3444 Dundee Rd., Northbrook, IL 60062 (phone: 312-480-7667). ***—Bill Kunkel***

Circle #173 on Reader Service Card



GET MORE PLEASURE FROM THE BIBLE WITH

LANDMARK

The Computer Reference Bible

Here's what LANDMARK will enable you to do:

- ✔ SEARCH THROUGH THE BIBLE---Find Phrases, words or sentences.
- ✔ DEVELOP TOPICAL FILES---Copy from The Bible text and search results then add your own comments and notes.
- ✔ COMPILE YOUR PERSONAL BIBLE--- Outline texts in color. Add Notes and comments. Create your own supplementary Study files.
- ✔ CREATE FILES--- Then convert them for use with wordprocessors like Paperclip and GEOS.
- ✔ MAKE SUPPLEMENTARY STUDY FILES--- and develop translation variations.

SUGGESTED RETAIL **$164.95**

ASK ABOUT OUR FALL '88 SPECIAL!

v1.2 for C64 or v2.0 for C128/1571

CALL OR WRITE TODAY FOR A FREE BROCHURE, WHICH SHOWS HOW VALUABLE LANDMARK CAN BE IN YOUR BIBLE STUDY

P.A.V.Y. Software P.O. Box 1584
Ballwin, MO 63022 (314) 527-4505

ASK FOR IT AT YOUR LOCAL SOFTWARE DEALER!

Circle #209 on Reader Service Card

COSMIC RELIEF: PROF. RENEGADE TO THE RESCUE

Datasoft
Commodore 64
Disk; $24.95

Cosmic Relief is an action-adventure with the backdrops and characters from one of those world-spanning Victorian science fiction novels full of improbable inventions and all kinds of eccentric characters.

Although created in England by Teque Software Development Ltd., *Cosmic Relief* represents the logical evolution of the action-adventure format pioneered by Datasoft in games from *Conan the Barbarian* to *The Goonies*. These games mix straight-ahead action with elements from role-playing adventures to form a new kind of entertainment that requires mental as well as physical dexterity. *Cosmic Relief* has that same mix of physical puzzles and arcade-style action, but adds elements of camp comedy and surreal science-fantasy. These additions clearly improve the recipe.

The story goes like this: Forty years before the game begins, Professor K.K. Renegade predicted an asteroid would hurtle toward Earth and eventually destroy our beloved planet. When nothing happened, however, the Prof. was subjected to ridicule and censure. Feeling basically unappreciated, he took off for parts unknown, and no one has seen him since.

Now it's forty years later, and guess what? Yep, here comes that asteroid! And, believe it or not, people actually *remember* the old crackpot who predicted it almost half a century earlier! Totally at a loss as to what to do, the citizenry logically concludes that Prof. Renegade must be found, apologized to, and set to the task of saving us in spite of our shortsighted selves.

This task is in the lap of the user, who must choose one of five soldiers of fortune to represent him on his search for Prof. Renegade. There's the robust Brit, Fortisque Smythe, master of many skills but something of a self-promoter. Big John Caine is a burly, fresh-faced Yankee; Wu Pong, a famed Japanese adventurer; Herr Krusche, a valiant German explorer; and Henri Beaucoup, a world-renowned French daredevil. Though their differences are largely cosmetic, each has a specific object within the game that is his personal key to locating Renegade.

As the player surrogate moves around the multidirectional scrolling playfield, he encounters a series of objects left behind by previous unsuccessful expeditions. These range from the wacky to the whimsical and include a flying vacuum cleaner, a magical flute (especially helpful for mellowing out snakes), and a coat hanger that turns out to be good for more than keeping one's jacket unwrinkled!

The player can carry multiple objects thanks to offscreen native bearers. At any time, the player can access the inventory of either bearer in order to exchange items.

The game also accesses a T (Think) command when the user is stuck. The onscreen player will then think about the item he needs to get past the log-jam. This item is visualized in a thought balloon above the hero's head.

If the player gets *really* desperate, there's a map and cheat sheet packed with the game that reveals the purpose

of every object and the key item for each onscreen surrogate.

The playfield contains the visual display and a data area across the bottom third of the screen. This strip lists current and high scores, the day and time (the player has only 30 days to construct an asteroid deflector), and a visual inventory.

The only real problem is that many of the items are not easily identified due to occasional lapses in the artwork. For example, the basket to which the player must affix a hot air balloon looks disarmingly like a toilet bowl!

Cosmic Relief: Prof. Renegade to the Rescue is an amusing and engaging entertainment that piques the intelligence while challenging the motor skills of the user.

Datasoft, 19808 Nordhoff Place, Chatsworth, CA 91311 (phone: 818-886-5922). ***—Bill Kunkel***

Circle #174 on Reader Service Card

POOL OF RADIANCE

Strategic Simulations
Commodore 64
Four double-sided disks; $39.95

This mammoth fantasy role playing game (RPG) is the first title SSI has published under its license from TSR, creators of the trailblazing "Dungeons & Dragons." It is derived from the campaign module of the same name which TSR produced for the pencil-and-paper "Advanced Dungeons & Dragons," a sophisticated revision of Gygax and Arneson's basic rules.

The usual horde of monsters has overrun the fabled city of Phlan, located in the North of the Forgotten Realms. The computerist creates a band of adventurers which battles the creatures and their mysterious leader. Although the player must repulse the monster army and restore Phlan to its former glory to win, running questing parties with no larger goal in view provides hours of entertainment.

It is difficult to assess this product's originality. Whose fault is it that *Pool of Radiance* precisely simulates the game, "Advanced Dungeons & Dragons," which inspired a dozen earlier role playing disks? It is undeniably similar to *Wizardry, The Bard's Tale, Might & Magic, Alternate Reality,* and all the other programs which "borrowed" experience points, character level, moral alignment, and much more from "Advanced Dungeons & Dragons." The main difference is that *Pool of Radiance* officially and unambiguously acknowledges the source of its play mechanics and rules structure.

As in other computer RPGs, the player creates characters, forms them into a party, and sends it into the world to gain experience through encounters with monsters, magic, and treasure. As characters accumulate experience, they rise in level and acquire greater power. A party with sufficient power can defeat the monsters and liberate Phlan.

Veteran computer role playing gamers will find the "quick start" card supplied with *Pool of Radiance* enough to get going. For those who require a fuller explanation, SSI provides a lucid rules manual and a separate book of background information about the Forgotten Realms.

Everything works off menus, and there are plenty of onscreen prompts to coach the solitaire Commodore owner through the multipart turn. Frequent disk-switching disrupts the smooth flow of events, but it is unavoidable in a game of this scope and complexity.

The main display screen gives the armor class and hit points of each party member and presents a drawing of the current location. The illustrations are colorful and animated, but they are not quite as slick as in *Bard's Tale II* and *III.* A complete report on each character in the party is also available on subsidiary screens.

Pool of Radiance does, however, introduce a few novel elements. The biggest change involves non-player characters (NPCs), which electronic RPGs have hitherto ignored. A party can talk to NPCs and ask them to join the group. Of course, it is sometimes difficult to gauge the loyalty of strangers, and seemingly docile creatures may turn traitor if they don't receive proper treatment.

A major innovation is the tactical battle display. During combat, a close-up of the engagement replaces the main screen. This system is much more satisfying than abstract summaries. The computerist actually sees each individual character move, cast spells, deliver sword blows, and take damage from attacks.

Pool of Radiance is an impressive beginning for this series of adventures set in the Forgotten Realms. It is hard to imagine anyone who likes fantasy role playing games who would not enjoy an electronic trip to the beleaguered city of Phlan.

Strategic Simulations, 1046 North Rengstorff Ave., Mountain View, CA 94043 (phone: 415-964-1353).

—Arnie Katz

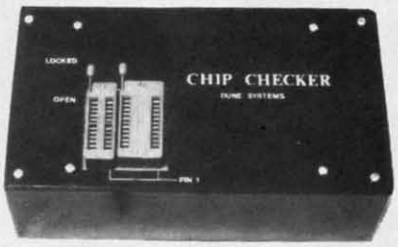
Circle #177 on Reader Service Card

ALIEN DESTRUCTION SET

Scorpion
Commodore 64
Disk; $29.95

Despite first impressions, *Alien Destruction Set* is *not* a construction kit. It is a collection of four action and action-strategy games which share a science fiction theme. The quartet was designed by CRL, a kind of game design collective. All four feature space combat seen from an overhead perspective and enlivened by impressive music and graphics, but each has its own unique elements. As is the case with most collections of games, the four are not

CHIP CHECKER



TESTS and/or IDENTIFIES

- Over 600 Digital ICs
- 74/54 TTL + CMOS
- 14/4 CMOS
- 9000 TTL
- 8000 National and Signetics
- 14-24 Pin Chips (.3" + .6" widths)

Pressing a single key identifies/tests chips with ANY type of output in seconds. The CHIP CHECKER now also tests popular RAM chips. The CHIP CHECKER is available for the C64 or C128 for $159. The PC compatible version is $259.

DUNE SYSTEMS
2603 Willa Drive
St. Joseph, MI 49085
(616) 983-2352

Circle #210 on Reader Service Card



KONAMI HITS ARE HEADING HOME.

With our new software, your favorite arcade games come alive on your home computer.





If you own an IBM, Amiga or Commodore computer—Watch out! Because 4 of Konami's most awesome adventures are about to invade.

You'll confront the missions you've dreamed of in Rush 'N Attack, Contra, Jackal and Boot Camp. And you'll find yourself face to face against unequaled challenges, with incredible graphics, awesome music, and sound effects that'll blow you away.

So check out Konami's newest action wherever great software is sold. And be prepared for war.

KONAMI®





Konami® is a registered trademark of Konami Industry Co. Ltd. Rush 'N Attack,™ Contra,™ Jackal™ and Boot Camp™ are trademarks of Konami Inc. I.B.M.® is a registered trademark of International Business Machines Inc. Amiga® and Commodore® are registered trademarks of Commodore Business Machines Inc. Screens shown were photographed on an Amiga system.

YOU'LL FIND KONAMI GAMES IN THESE STRATEGIC LOCATIONS.

BABBAGES

CHILD WORLD AND CHILDREN'S PALACE

ELECTRONICS BOUTIQUE

FEDCO STORES

LIONEL KIDDIE CITY, LIONEL PLAYWORLD AND LIONEL TOY WAREHOUSE

TOYS "R" US

WAREHOUSE ENTERTAINMENT

ZAYRE
(Boston and Washington D.C. Area Stores Only.)

Attention Dealers:
For further information on Konami's line of computer games, call customer service at (312) 595-1443.

ARIZONA
MESA
Compute or Play
1000 Fiesta Mall

CALIFORNIA
BAKERSFIELD
Software Etc.
2701 Ming Ave.
V. Plaza

CHULA VISTA
R & R Software
1048 3rd Ave.
(619) 426-7011

CITY OF INDUSTRY
Software Etc.
Pomona Hwy. at Azusa

FOSTER CITY
Home Computing Center
1125 E. Hillsdale Blvd., #103

SAN DIEGO
Computer Outlet
7940 Silverton Ave.
(619) 740-0113

SANTE FE SPRINGS
Fedco
9300 Sante Fe Springs Rd.
(213) 946-2511

SUNNYVALE
HT Electronics
346 W. Maude
(408) 737-0900

TORRANCE
The Warehouse
19701 Hamilton Ave.
(213) 538-2314

CONNECTICUT
DARIEN
Walden Software
800 Post Road

NEW BRITAIN
Romek Home Computer
432 W. Main St.

FLORIDA
GAINESVILLE
Florida Bookstore
1614 W. University
(904) 376-5606

LAUDERDALE LAKES
Software City
3700 W. Oakland Park Blvd.
(305) 735-6700

PANAMA CITY
Gulf Coast Computers
674 W. 23rd St.

PLANTATION
Software Software
612 Broward Mall
(305) 476-0595

WEST PALM BEACH
Computers 4 Rent
2695 N. Military Trail
(407) 471-1976

ILLINOIS
AURORA
Micro-Tech Solutions
991A Aurora Ave.
(312) 892-3551

CANTON
Blessman's Inc.
175 S. Main

CHICAGO
Software Plus
6212 N. Western Ave.
(312) 338-6100

DANVILLE
Data Center
108 N. Vermilion

HANOVER PARK
Software Plus West
2001 Irving Park
(312) 837-6900

LOVES PARK
Union Hall Inc.
6321 N. 2nd St.

SPRINGFIELD
Illini Software Center
2036 S. McArthur

WHEELING
Software Plus
731 W. Dundee Rd.
(312) 520-1717

INDIANA
PLAINFIELD
Simply Software
311 Gordon Dr.

KENTUCKY
LEXINGTON
Computer Dimensions
171 W. Lowry Ln.

LOUISIANA
SHREVEPORT
Discount Computer Software
544 E. King's Hwy.

MAINE
BELFAST
Skylight Software
22 Miller St.
(207) 338-1410

CARABOO
Mementos
86 Sweden St.
(207) 498-3711

WESTBROOK
Hands On Computers
861 Main St.
(207) 854-1155

MASSACHUSETTS
PITTSFIELD
Nichols Electronics
274 Wahconah St.
(413) 443-2568

WELLESLY
Memory Location
396 Washington St.
(617) 237-6846

WORCESTER
The Software Shop
84 Pleasant St.
(617) 791-5905

MICHIGAN
CLAWSON
Software Trends
230 S. Main St.

CLIO
The Edge Connector
124 North Mill
(313) 686-1070

FLINT
I/O Software
G-3304A Corunna Rd.

GARDEN CITY
Soft-House Computer Center
32647 Ford Rd.
(313) 522-3015

TRAVERSE CITY
The Software Shop
710 Centre St.

MISSOURI
CAPE GIRARDEAU
Midwest Computers
203 West Park Mall
(314) 339-0022

NEW JERSEY
BRIDGEWATER
Software Etc.
400 Commons Way

WAYNE
Software Etc.
Willowbrook Mall

NEW MEXICO
ALBUQUERQUE
Page One
11200 Montgomery N.E.
(505) 294-2026

NEW YORK
ALBANY
Computer Cellar
911 Central Ave.
(518) 482-1462

BAY SHORE
Software Etc.
1701 Sunrise Hwy.

CHEEKTOWAGA
Papa's Computerware
2789 Union St.
(716) 684-7272

FLUSHING
Software Etc.
39-01 Main St.

HIGHLAND FALLS
Software Affair
188 Main St.
(914) 446-4121

HOLBROOK
Great Escapes
5801 Sunrise Hwy.

KENMORE
Software Supermarket
3670 Delaware Ave.
(716) 873-5321

LATHAM
Contemporary Computers
893 Loudan Rd.
(518) 783-1088

NEW YORK CITY
J&R Music World
23 Park Row
(212) 732-8600

Leigh's Computer
1475 Third Ave.
(212) 879-6257

RIDGEWOOD
Quo Vadis
70-20 Fresh Pond Rd.

ROCHESTER
Leon's Computer Mart
103 Clinton Ave.
(716) 325-2787

SCOTIA
Select Software
108 Mohawk Ave.
(518) 382-7886

OHIO
DAYTON
Microtyne
4049 Marshall Rd.

FAIRFIELD
Microware Magic
6625 Dixie Hwy.
(513) 874-6560

MEDINA
Ram-Run Computer Products
891 N. Court
(216) 263-4428

PENNSYLVANIA
WEST REDDING
English's Computers
608 Penn Ave.

RHODE ISLAND
WARWICK
Software Connection
101 W. Natick Rd.

WOONSOCKET
Galaxy Computers
332 River St.

TEXAS
BEAUMONT
Software Rental
2855 Eastex Freeway #D

FORT WORTH
Wedgewood Software
5312 Woodway
(817) 292-7353

HOUSTON
Floppy Wizard
271 Memorial
(713) 461-8660

SAN ANTONIO
Computer Experience
552[illegible] Blanco
(512) 340-2901

UTAH
SALT LAKE CITY
Armadillo Brothers
3330 S. State
(801) 484-2791

VIRGINIA
MARTINSBURG
My Software Heaven
Meadowlane Plaza Box 2
(304) 263-1228

WOODBRIDGE
Virginia Micro Systems
13646 Jefferson Davis Hwy.
(703) 491-6502

WASHINGTON
LONGVIEW
Software Depot
1310 Oceanbeach Hwy.

LYNWOOD
Family Computers
3333 184th St. S.W.
(206) 775-3530

PACOMA
Nibbles & Bytes
4020 S. Steele St. #105

SEATTLE
Omni International Trading Post
3826 Woodland Park Ave. N.
(206) 547-6664

VANCOUVER
Software Support Int.
2700 N.E. Andreison D13

WISCONSIN
JANESVILLE
Romeyn Software
2100 E. Milwaukee

MILWAUKEE
Computer Software Center
10710 W. Oklahoma Ave.

RACINE
Computer Paradise
4901 Washington Ave.

KONAMI®

Only Rush 'N Attack and Contra will be available for Amiga in 1988. ©1988, Konami Inc.

Circle #197 on Reader Service Card

equally exciting, but the best of the *Set* is a real winner.

Thundercross is a straightforward space combat game with little in the way of innovation to recommend it. The Thundercross is a massive, lumbering craft that seems to function as an asteroid-sweeper in this horizontally scrolling contest. This sweeper can fire in any of eight directions at a variety of nondescript targets and has movement capability in all directions, including backwards. The Thundercross is protected by shields, which are automatically deactivated when the cannons fire.

Vengeance is far more polished and professional-looking, without being much more original than *Thundercross.* The player's ship moves up through a vertically scrolling playfield depicting a vast network of alien refineries. The graphics are extraordinarily sharp, as are the explosions and general sound effects. They combine to make this a compelling if slightly old-fashioned arcade experience.

Death or Glory is less conventional than either of the above. Instead of firing a standard front-mounted cannon, players in this multidirectional scrolling game drop bombs on a squadron of Deathstar-size alien destroyers. Pressing the action button while pushing forward on the joystick unleashes cataclysmic bombs capable of ripping entire sections from the hulls of any enemy ship unfortunate enough to pass below.

Jon Law's graphics on *Death or Glory* are very nice, but his stars don't move. This undermines any illusion of movement unless an alien ship is onscreen. Also, the panels blow off the hulls in neat, square sections which neither makes sense nor enhances the game's sense of realism. Even so, *Death or Glory* is an entertaining and somewhat offbeat diversion.

The jewel in the Crackerjack box, however, is unquestionably *Discovery.* At first it appears to be a simple multidirectional scrolling shootout, but it soon reveals unexpected depth. While the player's ship must deal with a horde of gnatlike alien fighters, the priority mission is to complete an all-important circuit board by winning a series of mini-games.

These mini-contests are accessed by positioning the player's ship over the entrance hatch of each of the alien space stations. The player is then transported into one of a series of action, strategy, and action-strategy contests.

The mini-games use pattern-recognition and other classic brain twister elements to create kinetic puzzles with occasional arcade flourishes. For example, one of the action games is a sideways variant of *Centipede.* Some of these puzzles are real stumpers and will take several attempts to solve, but each is worth the effort.

Alien Destruction Set is a worthwhile collection from a group of talented up-and-coming game creators. The range within this quartet of entertainments is considerable, and should prove satisfying to most fans of action-oriented science fiction games.

Scorpion, 19 Harbor Dr., Lake Hopatcong, NJ 07849 (phone: 201-663-0202). ***—Bill Kunkel***

Circle #172 on Reader Service Card

STOCKER

Capcom
Commodore 64
Disk; $29.95

Okay, nostalgia lovers, here's a blast from the past: a stock car racing game with an *overhead* perspective!

With the exception of auto *combat* games, like *Spy Hunter* (Bally/Midway) and *Autoduel* (Origin), the overhead view virtually disappeared from the auto simulation scene for several good reasons. Unfortunately, *Stocker,* a stock car racing game from Capcom, illustrates all of them.

The most obvious reason for the scarcity of bird's-eye-view driving/racing games is that users are now spoiled. First-person perspectives (behind-the-wheel) and pseudo first-person (the car itself appears onscreen in the foreground) found in games like *Pole Position* (Atari), *Speed Buggy* (Data East), and *Test Drive* (Accolade) are simply more exciting.

Players clearly prefer to see the road from a driver's viewpoint because it is realistic. Driving is not an exotic experience, like piloting a spaceship; people ride in cars every day of their lives. Yet *Stocker* is presented from a point of view that only a pigeon could relate to. People don't watch auto races from blimps or hot air balloons, so they're not likely to resonate to *Stocker's* high-altitude viewpoint which displays the vehicles, buildings, and topography as faraway, insect-sized icons. Though these onscreen objects are rendered in precise detail, the vehicles become indistinguishable when viewed as if from a low-flying plane.

Worse still, the roadway doesn't scroll. Instead, the player's car reappears on a new map-section after driving off the edge of a previous screen. This is extremely disorienting, since the player must scan each new screen to locate the car's position and reorient the steering.

This disorientation is a keystone of overhead driving games. It is almost impossible to keep track of where you've been and where you're headed since there are no street signs or other markings. But then, the user is likely to have enough trouble just staying on the road.

In first-person driving games, all directions are true. Pushing the joystick left turns the car left. If a game takes the driver *outside* his vehicle, however, steering becomes compass-based. Instead of being focused around the user and his vehicle, reality is linked only to the compass headings. Pushing the joystick up (north) will always cause the car to head north, but depending upon the direction the vehicle is going in, that same command could result in the car making a turn in any of three directions.

If the car is traveling north to south and the player moves the joystick to the left (east), the car will head east by making a *right* turn. If the car is heading north and the player makes the same joystick command, the car will head east by making a *left* turn. If the car is heading east, however, the east command will invoke an abrupt U-turn.

The playfield for *Stocker* consists of the screen-sized overview, a score counter, high score, and speedometer. Other motorists include truckers, bikers, and even the Highway Patrol, who intercept speeders and cause them to lose time.

Stocker is a quaint game, almost like an antique that's been painfully restored using state-of-the-art techniques. The tiny graphics are remarkably clean-cut, with each vehicle pictured in minute detail. The race itself is accompanied

BACK ISSUES OF Ahoy!

#2—FEB. '84 Illustrated tour of the 1541! Artificial intelligence! Synapse's Ihor Wolosenko interviewed! String functions! And ready to enter: Music Maker Part II! Screen Manipulation! Night Attack! Relative Files!

#3—MAR. '84 Anatomy of the 64! Printer interfacing for VIC & 64! Educational software series begins! VIC game buyer's guide! And ready to enter: Address Book! Space Lanes! Random Files on the 64! Dynamic Power!

#5—MAY '84 Future of Commodore! Inside BASIC storage! Memory management on the VIC & 64! Guide to spreadsheets! Hurray for arrays! And ready to enter: Math Master! Air Assault! Biorhythms! VIC Calculator!

#7—JULY '84 MSD dual disk drive! Database buyer's guide! Training your cursor! Screen displays! File Sleuth! Users Groups! And ready to enter: Renumbering! Checklist! Math Defender! Brisk! What's My Job?

#8—AUG. '84 Choosing a word processor! Computational wizardry! Creating your own word games! Sound on the 64! And ready to enter: Micro-Minder! Directory Assistance! The Terrible Twins! Words Worth!

#9—SEPT. '84 Program your own text adventure! Build a C-64 cassette interface! Video RAM! Word processors, part II! And ready to enter: Salvage Diver! DOS! Sound Explorer! The Castle of Darkness! Base Conversions!

#10—OCT. '84 C-64 graphics programs! Bit-mapped graphics! Joystick programming! Graphics processing! And ready to enter: VIC 40 Column Operating System! BAM Read & Print! Emerald Elephant! Lawn Job!

#11—NOV. '84 Music programs & keyboards for the 64! Graphics feature continues! 2-D arrays! And ready to enter: PTE word processor! Block Editor! Alternate Character Set for the 64! Tunnel of Tomachon!

#12—DEC. '84 Buyer's guide to printers! 1525 printer tutorial! Fast graphics with custom characters! Guide to KMMM Pascal! Diving into BASIC! And ready to enter: Construction Co.! Space Patrol! Cross Ref!

SOLD OUT

#13—JAN. '85 VIC and 64 OS exposed! Sprites! Insert a 1541 device disconnect switch! Ghost Writer! And ready to enter: Ultra Mail! Music Tutor! Alice in Adventureland! Midprint! To the Top! Tape/Disk Transfer!

SOLD OUT

#14—FEB. '85 Printer interfacing! Multicolor sprites! Modems! Bulletin Boards! Theory of game design! Buying a modem! And ready to enter: Futurewar! Fontasia! VIC Eraser! Insurance Agent! Flankspeed! Telelink 64!

#15—MAR. '85 Creating multiscreen gameboards! Inside the Plus/4! Commodore DOS! And ready to enter: Old Routine! Programmable Functions! Automatic Line Nos.! Home Budget! Salmon Run! Numerology!

#16—APR. '85 Assembly language column begins! Programming the joystick! 1541 disk drive alternatives! The Kernal! And ready to enter: Hop Around! Faster 64! Booter! Elecheck! BASIC Trace! Space Hunt!

#17—MAY '85 Disk drive enhancements! Install a reset switch! Assembler escapades! And ready to enter: Super Duper! Two-Column Directory! DSKDU! Raid! DOS Plus! Font Editor! Tile Time! Interrupt Wedge!

#18—JUNE '85 Music & graphics entry system! How modems work! Inside the 6510! And ready to enter: Quad-Print! Mapping 4.4! Towers of Hanoi! Speedy! Duck Shoot! Bit Dumping! Screen Magic! 6510 Simulator!

#19—JULY '85 PROM Programming! 3-part harmonies on VIC/64! Speeding pixels! And ready to enter: Auto-Append! Script Analysis! Wizard of Im! Lucky Lottery! Brainframe! Etch! Printat! Autos: Leasing v. Buying!

#20—AUG. '85 Inside the 128! Real-world simulations! Sound effects! Modems! And ready to enter: Windows! Formatter! Sound-a-Rama! Screen Dump! Selectachrome! Disintegrator! Fidgits! Gators N Snakes!

#21—SEP. '85 Inside the 1571 drive and 128 keyboard! Sprite programming! And ready to enter: Fastnew! Go-lister! File Lock! Dragon Type! Superhero! Auto-Gen! Moxey's Porch! Fish Math! Ahoy!Dock! Invective!

#22—OCT. '85 Create cartoon characters! Infinitesimal intrigue! Secrets of copy protection! And ready to enter: Shotgun! Maestro! Solitaire! Mystery at Mycroft Mews! Gravinauts! 1541 Cleaning Utility! Shadey Dump!

#23—NOV. '85 Guide to adventure gaming! ML sprite manipulation! BASIC for beginners! And ready to enter: Lightning Loader! Knight's Tour! Chopper Flight! Rhythmic Bits! Instant Bug Repellent! File Scout! Slither!

#24—DEC. '85 Speech synthesizer! The IBM Connection! The year's 25 best entertainments! And ready to enter: Gypsy Starship! Directory Manipulator! Cloak! Gameloader! Jewel Quest! Lineout! Santa's Busy Day!

#25—JAN. '86 Build a speech synthesizer! Survey of sports games! And ready to enter: Martian Monsters! Streamer Font! Microsim! Haunted Castle! Knockout! Infraraid! Alarm Clock! Memory Check! Scratch Pad!

#26—FEB. '86 Windows! Build an autoexec cartridge! Align your 1541! Survey of flight simulators! Structured programming! And ready to enter: Arena! Head to Head! Crabfight! Treasure Wheel! Character Dump!

#27—MAR. '86 Programming educational games! Memory dumpers! Choosing a copy program! Custom characters! And ready to enter: Ahoy!Term 128! Trivia Game Maker! Brickbusters! Easy Lister! Programmer's Aid!

#28—APR. '86 Comet catching! Survey of action and strategy games! Screen dumping! And ready to enter: Chrono-Wedge! Mr. Mysto! Air Rescue! Notemaker! Screen Window! JCALC! Hidden Cavern! Swoop!

#29—MAY '86 128 graphic bit map! Epyx strategy guide! 128 commands! ML music programming! And ready to enter: Bigprint! Star Search! Failsafe! English Darts! Ski Folly! Free RAM Check! Alchemist's Apprentice!

#30—JUNE '86 Debugging dilemmas! Public domain software! Winning at Ultima! Computer Aided Design! And ready to enter: LazyBASIC! Got A Match? Star Strike! Queen's and Bishop's Tours! Shaker! Trackdown!

#31—JULY '86 Inside the Amiga! Conditional branching! Chess programs! 128 and 64 DOS! And ready to enter: Screen Sleuth! Skull Castle! Head-on! Nebergall Run! Wordcount! Crazy Joe! Fidgits' Music School!

#32—AUG. '86 Inside the Amiga, part II! Approaching infinity! C-64 war simulations! Pascal for beginners! ML graphics! And ready to enter: Reversi! Highlight! Disk Cataloger! Meteor Run! Trim! Step On It! Flap!

#33—SEPT. '86 Windows and viewports! Sound & music on the 64! COMAL! And ready to enter: The Last Ninja! Speech64! Multi RAM! Dogcatcher! Trapped! Matchblocks! Variable Manager! Dual Dump! Mine Canyon!

#34—OCT. '86 Build a digital oscilloscope! ML speed techniques! And ready to enter: Vault of Terror! Quick Change! Penguins! Attack Force! Disk Checkup! Dvorak Keyboard! Mountaineer Mack! 128 to 64 Autoboot!

#35—NOV. '86 C-128 shadow registers! Data file handling! PROMAL! Habitat! And ready to enter: Teleporter! 128 RAM Check! Discs of Daedalus! Guardian! Tenpins! Syntax Patrol! Deluxe List! Long Lines! Detonation!

#36—DEC. '86 File manipulation! C-128 shadow registers! Football games! And ready to enter: The Artist! Minotaur Maze! Mouse in the House! Lazy Source Code! Rebels and Lords! Speedway! The Editor! Micro City!

#37—JAN. '87 Pointers and the monitor! Best games of '86! DOS for beginners! And ready to enter: Vortex! Hanger 14! BASIC Ahoy! Catacombs! Lixter! Dark Fortress! PermaLine! Starfighter! Bugout! Screens!

#38—FEB '87 Hacking into machine language utilities! Amiga RAM expanders! And ready to enter: Window Magic! Crunchman! User Conventions! The Adventurer! More BASIC 128! Jailbreak! Turtle Rescue! 640!

#39—MAR. '87 Basic esthetics! Survey of video digitizers! Multiplayer games! And ready to enter: C-64 Compressor! Wizard Tag! Turbopoke! Rescue 128! Lights Out! Pinball Arcade! Stow Away! Caverns of Geehonk!

#40—APR. '87 Inside the Amiga 2000! Fractals! Baseball games! COMAL, turtle graphics, and Logo! And ready to enter: Infoflow! Laps! Pieman! List Formatter! Scrambler! Extended Background Mode! Planet Duel!

#41—MAY '87 Kernal power! 64 and Amiga graphics! Microworlds in COMAL! Brain games! Dark Fortress master maps! And ready to enter: Moondog! Startup! Illusion Master! Wall Crawler! Scavenger Hunt!

#42—JUNE '87 Megaflops and microseconds! Sci-fi braingames! C-64 to Amiga file transfer! And ready to enter: D-Snap! Wraiths! Galactic Cab Co.! Cave of the Ice Ape! ALT-Key 128! Power Squares! 128 Multi RAM!

#43—JULY '87 Real world interfacing! Bit map graphics tutorial! C-64 graphic conversion! Martial arts software! And ready to enter: Wizard Tag II! Data Creator! Plink & Plonk! Univaders! Data Express! 128 Scroller!

#44—AUG. '87 Electronic screen swapping on the C-128! Science fiction action games! The death of GOTO! Amiga reviews! And ready to enter: Archer! Banner Print! Route 64! Steeplechase! Batter Up! Scanner!

#45—SEP. '87 The 128 versus The Clones! Building an Amiga trackball! MSD update! CES Report! And ready to enter: Crystallus! Spriteshell! Hoops! Chainmail! No News! PS to GEOS! Centerfold! Red Alert!

#46—OCT. '87 A rainbow of data structures! BASIC 8.0 reviewed! Buying guide to COMAL! Tips Ahoy! Art Gallery! And ready to enter: Empire! C-64 RAMDrive! Hotfoot! Platforms! Spray-Cam! Jam Attack!

#47—NOV '87 The ins and outs of data organization! Overview of C-64 memory expanders! Commodares! And ready to enter: Orbit! RAMCO! A-Maze-Ing! Line Sentry! Desert Front! Paper Route! Flash Flood!

#48—DEC. '87 Exploring artificial intelligence! Expansion port tutorial! Memory expanders! And ready to enter: Redirect! Silhouette! Fueling Station! Take Two! Pizza Boy! Sprite-On! Warship! Cliffhanger!

#49—JAN. '88 Iterative mathematics and graphics! Expansion port tutorial, part II! The best C-64 and Amiga games of 1987! And ready to enter: Infoflow 64! TextSave! Clone-A-Matic! Ice Titans! Jungle Jake!

#50—FEB '88 Investigating audible wave phenomena! Cartridges! Commodore 64 emulators for the Amiga! And ready to enter: Coffee Break! Crypt of Fear! Screen Wizard! ML Ranger! 128 Smart Merge! Marauder!

#51—MAR '88 Synthesizing waveforms! Comprehensive guide to Commodore power supplies! Utilizing Amiga HAM mode! Art Gallery! And ready to enter: Vee Kloros! The Extractor! 3-D Graphic Projector! Phantasy!

#52—APR. '88 BASIC's hidden treasures! Updating your Amiga 1000's printer port! Disk drive accelerators! And ready to enter: Time Subway! IRQ Messenger for the 64 and 128! Sprite Exploder! Hi-Res Windows! Barricade!

#54—JUNE '88 Advanced disk drive commands! Creating your own text games, part I! Programming in COMAL! And ready to enter: Rashgar! Movie Scroll! MOB Blob! Snap Snake! Phobia! Lost Dutchman's Mine!

#55—JULY '88 Making the thermal connection! BASIC/COMAL speed tests! Text game programming, part II! And ready to enter: Tomb of Horror! Vari-Scan! Window Dressing for the 128! Guerilla! Lunar Buggy!

#57—SEPT. '88 Build a lightning fast compiler! Variegated COMALs! Consumer Electronics Show report! Tips Ahoy! And ready to enter: Video Snapshot! The V'Lurian Mines! Color Editor! Trap Shoot! Turbo Ski!

#58—OCT. '88 The many faces of a compiled BASIC program! GEOS 2.0 and the latest entertainment software reviewed! And ready to enter: Side Border Scroll Editor! Bombs Away! Sprite Rotator! Capture!

#59—NOV. '88 Implementing string variables in a BASIC compiler! Art Gallery! Tips Ahoy! Reviews! Scuttlebutt! And ready to enter: Island Quest! Easy80! Sack Race! Insert! And the completed version of Mini-comp!

All issues $4.00 except #2, #3, #21 ($10.00)

Please send me

____ copies of issue #____ **____ copies of issue #____**

____ copies of issue #____ **____ copies of issue #____**

Enclosed find check or money order for $_____

(outside US add $1.00 per copy)

NAME_____

ADDRESS_____

CITY_____ **STATE**_____ **ZIP**_____

Send to: *Ahoy!* Back Issues, Ion International Inc., 45 West 34th Street—Suite 500, New York, NY 10001.

by short musical phrases (including the old "See the USA in your Chevrolet!" jingle) that should evoke memories from users.

The problem with *Stocker* is like the problem with all spiffed-up antiques: when all is said and done, it's still an old contest, albeit an attractive one.

Capcom, 1283-C Old Mountain View/Alviso Rd., Sunnyvale, CA 94089 (phone: 408-745-7081).

—Bill Kunkel

Circle #176 on Reader Service Card

LANE MASTODON VS. THE BLUBBERMAN

Infocom
Commodore 64
Disk; $12

We hear a lot about this or that being "a bold new medium." Well, surprise, surprise, InfoComics represents a legitimately new entertainment form, computerized comic books. Created by Infocom and Tom Snyder Productions, InfoComics are *not*, nor do they attempt to be, games.

Until now, software publishers have been hidebound in clinging to games as the computer's dominant entertainment medium (with some forays into art, music, and the occasional non-game simulator). Tom Snyder theorized that there are, or should be, many different forms of interactive entertainment possible on the computer. This insight resulted in InfoComics: animated stories told with a comic book sensibility that use the computer like a VCR. The user can fast-forward, rewind, advance frame-by-frame, and periodically branch off the current storyline to follow an alternative character's point of view.

One of the real plusses for this system is its simplicity. Each InfoComic comes with a warranty, a brief explanation of the system's "branching" technique, and a list of 10 keyboard commands. This includes a Bookmark, Restart, and three running speeds. Those are the only instructions that any user requires.

The InfoComics interface is one of the most brilliant innovations in entertainment software history. The screen is set up to look like an open page of a book or magazine. On the page are two windows, the larger one filling about three-fourths of the screen. This display area represents the comic book panel, one of the series of frames in which the graphic story is told. All visuals, dialogue, and thought balloons are contained within this window. Captions are broken out into the smaller window at the bottom of the page in deference to the long-standing traditions of illustrated adventure games.

There are some very good and some very bad things about *Lane Mastodon Vs. The Blubberman.* The action is told in a form that owes much more to the cinema than the graphic story. The drawings are minimalist but very stylized. They're extremely well done with a limited but effective use of color. The numerous animated sequences utilize all the trendiest camera angles from films and TV: pans, tracking shots, fades, and transitions that have never been seen on a computer monitor. These are remarkably effective.

Unfortunately, *Lane Mastodon* reads more like a demo of the InfoComics system than an actual story that anyone might care about on its own. The story purports to be a cornball spoof of 1930s soap operas but really hasn't a clue about science fiction, before or after the 30s, and no notion at all of how comics work. Worse, the author(s) seem to have no affection for the material they're creating. They treat it with a condescending scorn that should burn in the guts of comic and SF fans like a bad burrito.

The plot involves the alien Blubbermen and their plan to take over the Earth of 2029 by turning an enlarging ray on small animals and insects. These oversized kitties and cockroaches will presumably overwhelm Earth's defenses and the Blubbermen will waddle in and pick up the pieces.

There is no reason to waste any of our time picking holes in this cheesecloth of a plot. I must ask, however, if only rhetorically, why enlarge *tiny* critters? Wouldn't it make more sense to make behemoths of creatures who are *already* big? Somehow the idea of a 300 foot rhino or a whale the size of two football fields is more intimidating than a 50 foot earthworm. That aside, the whole story, without recourse to alternate plotlines, runs in less than 10 minutes.

The story is loaded with sophomoric inanities that the writers must have felt would really have those simple-minded comic book fans rolling in the aisles. "Don't pluck your chickens before they hatch!" advises a character in one of the story's more side-splitting moments, and the designers might have listened to their own advice. *Lane Mastodon* also periodically cuts away to a Blubberman and a Thin Man (a slim race that's already been squashed by the avatars of alien avoirdupois). The pair perform a Siskel & Ebert routine, complete with the familiar theme music from "At the Movies," and remark on the plot's more inane elements.

The ironic thing about *Lane Mastodon* is how much it reads like a computer adventure without the interaction. During the story's climax, Lane reaches the pivotal enlarging ray, producing an animated sequence about how he has to turn it off. We then see a gigantic switch with ON/OFF buttons and Lane slowly pushes the OFF switch. In the moment's hesitation before Lane acts, gamers everywhere will be frantically scanning the keyboard for the "Turn ray off" command.

The InfoComics format could be the biggest software success in years. But first the creators of this wonderful tale-telling system must work to discover the kind of stories InfoComics can do best and the creators capable of writing them.

Infocom, 125 Cambridge Dr., Cambridge, MA 02140 (phone: 617-492-6000).

Bill Kunkel

ACTION REPLAY IV

Datel Computers
Commodore 64
Cartridge: $59.99

I'm always put off by advertising that uses superlatives such as "ultimate." But Datel has some justification for claiming as they do that their Action Replay is "the ultimate backup cartridge." The main use of the product is to create backups of protected software. We will cover that function last, and first describe its other features.

Overview

The cartridge fits in the 64's expansion slot. It has two pushbuttons, Reset and Freeze. When plugged into a C-128, the computer powers up in C-64

Continued on page 54

FREE ADDITIONAL INFORMATION!

Our research shows that our readers are discriminating buyers. The majority of you are intermediate to advanced users, who seldom purchase a printer, a modem, or even a space shoot-em-up on impulse. But purchase you *do*—after making an intelligent choice based on all the information you have.

So why not make sure you have all the information there *is* to have—for the cost of a single stamp?

Most of the companies listed at right are eager to send you free promotional materials relating to their products or services. All you have to do is detach the Reader Service Card included here, circle the numbers that correspond to the items you're interested in, and stamp and mail the card prior to the date shown.

Manufacturers and mail order houses alike know that *Ahoy!'s* following is the most computer-literate enjoyed by any Commodore monthly. They respect that kind of sophistication. So use only the *Ahoy!* Reader Service Card to request information on products seen in *Ahoy!* And when contacting companies directly by mail or phone, be sure to tell them who sent you.

It'll help you—and us.

READER SERVICE INDEX

Page	Company	Svc. No.
8	Abacus Software	181
10	Abacus Software	189
12	Access Software	191
C-4	Access Software	165
12	Accolade	192
12	Activision	203
26	Alsoft	216
11	Blue Lion Software	186
34	Briwall	161
10	Broderbund Software	205
48	Capcom	176
9	Chip Level Designs	–
C-3	Cinemaware	199
10	Commodore	206
10	Commodore	188
16,17	Computer Direct	213
55	Computer Repeats, Inc.	196
15	Data East USA, Inc.	214
14	Datasoft	224
44	Datasoft	174
50	Datel	223
58,59	Datel	212
8	Digiscape Software	182
12	Discovery Software	193
45	Dune Systems	210
11	Epyx	187
39	Epyx	179
10	Exhibition Marketing	190
10	Gamco Industries	183
11	Haitex Resources	194
50	Infocom	175
46,47	Konami	197
40	Leisure Genius	178
4,5	Lyco Computer	207
8	LLM Press	180
12	MicroIllusions	204
14	Mindscape	225
40	Mindscape	173
8	Online Information	202
C-2	Origin Systems, Inc.	215
44	P.A.V.Y. Software	209
11	Precision Incorporated	195
19	Q-Link	208
28	Remsoft	211
10	Schnedler Systems	185
45	Scorpion	172
8	Simon & Schuster	201
43	Software Simulations	219
43	Software Simulations	123
6	Software Support	222
20,21	Software Support	198
45	Strategic Simulations	177
29	SOGWAP Software	200
37	Wedgwood Rental	220
31	Xetec, Inc.	221
10	Zwetzig Associates	184
7	*Ahoy!* Disk Magazine	–
13	*Ahoy!* Access Club #1	–
14	*Ahoy!* Binders	–
25	*Ahoy!* Subscription	–
38	*Ahoy!* Access Club #2	–
41	*Ahoy!* Disk	–
49	*Ahoy!* Back Issues	–

The publisher cannot assume responsibility for errors in the above listing.

SOURCE CODE FOR SCREEN POCUS 64

```
1030 C000 4C 06 C0          JMP ONE
1040 C003 4C 33 C0          JMP TWO
1050 C006 A9 00      ONE    LDA #0          ┐
1060 C008 8D 36 03          STA TAB         │ CLEAR TABLE THAT
1070 C00B 8D 37 03          STA TAB+1       │ CONTROLS WHEN ALL
1080 C00E 8D 38 03          STA TAB+2       │ FOUR SCREEN
1090 C011 8D 39 03          STA TAB+3       ┘ SECTIONS HAVE BEEN
1100 C014 A9 EA             LDA #234        ┐ PROCESSED
1110 C016 8D 28 03          STA 808         ┘ DISABLE STOP/RESTORE
1120 C019 A9 F9      RANDOM LDA #249        ┐
1130 C01B 8D 0E D4          STA $D40E       │
1140 C01E A9 EE             LDA #238        │
1150 C020 8D 0F D4          STA $D40F       │ USE SID VOICE 3 TO
1160 C023 A9 00             LDA #0          │ GENERATE RANDOM
1170 C025 8D 18 D4          STA $D418       │ NUMBERS
1180 C028 A9 81             LDA #129        │
1190 C02A 8D 12 D4          STA $D412       ┘
1200 C02D A9 A0             LDA #160        ┐ ALTERNATE TEXT
1210 C02F 8D 88 02          STA 648         ┘ SCREEN @ $A000
1220 C032 60                RTS
1225
1230 C033 A2 00      TWO    LDX #0          ┐
1240 C035 A9 04             LDA #4          │
1250 C037 85 FC             STA $FC         │ PREPARES ZERO PAGE
1260 C039 86 FD             STX $FD         │ POINTERS TO REAL
1270 C03B 86 FB             STX $FB         │ AND ALTERNATE
1280 C03D A9 A0             LDA #$A0        │ SCREENS
1290 C03F 85 FE             STA $FE         ┘
1300 C041 A5 01             LDA 1           SWITCH OUT BASIC ROM
1310 C043 29 FE             AND #254
1320 C045 85 01             STA 1
1325
1330 C047 AD 1B D4 NEWONE   LDA $D41B       ┐
1340 C04A A8                TAY             │
1350 C04B B1 FB             LDA ($FB),Y     │
1360 C04D D1 FD             CMP ($FD),Y     │
1370 C04F F0 36             BEQ OTHER       │
1380 C051 B1 FD      SI     LDA ($FD),Y     │
1390 C053 91 FB             STA ($FB),Y     │
1400 C055 A2 00      HERE2  LDX #0          │
1410 C057 BD 36 03   CHECK  LDA TAB,X       │ GET RANDOM NUMBER
1420 C05A F0 07             BEQ HERE        │ USE AS INDEX TO
1430 C05C E8                INX             │ TRANSFER REAL
1440 C05D E0 04             CPX #4          │ SCREEN ALTERNATE
1450 C05F 90 F6             BCC CHECK       │
1460 C061 B0 55             BCS DONE        │
1470 C063 E6 FE      HERE   INC $FE         │
1480 C065 E6 FC             INC $FC         │
1490 C067 A5 FC             LDA $FC         │
1500 C069 C9 08             CMP #8          │
1510 C06B 90 DA             BCC NEWONE      ┘
```

SCREEN

Fade In/Fade Your

By Peter

Through the years I have seen several fancy ways of displaying or erasing text screens on the Commodore 64. But my favorite effect is achieved by this short and easy to use machine language utility which uses a technique usually seen in hi-res screens. I call it "materializing" a screen or "dematerializing" it. Visually, the screen fades in or out of view, or fades away as a new screen fades in. As text screens are used much more than hi-res screens, I wrote the *Screen Pocus* utility for text screens on the C-64. You will be able to "fade in" or "fade out" text screens at the speed you wish. It's great for flashy screens, or to make new screens appear in multilevel games, or for menus, or wherever you need it. The utility is short, relocatable, and extremely easy to use!

TYPING IT IN

Screen Pocus is an all-ML utility, presented as a BASIC loader that also allows relocation of the routine. Type in the BASIC program and save it. Then type RUN. The ML routine will be POKEd to memory. It is currently loaded at address 49152, but change the value of SA to whatever start address you wish.

USING SCREEN POCUS

The utility has two entry points: one to create the screen which will fade into view, and the other to actually make the screen visible. Let's see how to use them.

SYS SA, where SA is the address at which you located the utility, will start the random number generator, clear some values, and place you at an alternate text screen (placed under

POCUS 64

Out Effects on Commodore

M.L. Lottrup

BASIC ROM at $A000-$A3FF). Whatever you print after this call will not be visible on the standard screen, but will be ready to materialize later. Make sure that this alternate screen you print does not cause a screen-scroll, or the resulting "materializing" screen will be garbage.

SYS SA+3 will start the materializing process, bringing the screen you printed earlier into view, shifting out whatever was currently in display.

Address 2 controls the shift speed, where 1 is the fastest speed and 255 (or 0) is the slowest. POKE the desired speed in memory location 2. A value of 70 is recommended for most uses.

A couple of things to take care of: as pressing RUN STOP or RUN STOP/RESTORE while creating the alternate screen (between the two SYS calls) would leave you in an awkward position (you won't be able to see what you type), the routine disables these keys until the screen has been materialized. This routine should not be used together with sounds or sprites. Also, try using the same colors, as color memory is the same for all screens (test this for best results and see the demo program included).

The routine uses the following addresses to operate:

$C000 - $C0C8 (when loaded at 49152)
2, 251-254, 820-822
$A000 - $A400 (located under BASIC ROM).

The short demo program I have included shows the power of this utility. It is written in BASIC, so just type it in and save it. The demo assumes the *Screen Pocus* utility is loaded in memory at $C000 (49152). □

SEE PROGRAM LISTINGS ON PAGE 73

The BASIC loader and demo for *Screen Pocus 64* are found on page 73. Source code is listed here for informational purposes.

```
                1520 C06D A9 04          LDA #4
                1530 C06F 85 FC          STA $FC
                1540 C071 A9 A0          LDA #$A0
                1550 C073 85 FE          STA $FE
                1555
                1560 C075 A5 02          LDA 2
                1570 C077 8D 34 03       STA TEMP
                1580 C07A A0 19    WA2   LDY #25
DELAY           1590 C07C 88       WA1   DEY
                1600 C07D D0 FD          BNE WA1
                1610 C07F CE 34 03       DEC TEMP
                1620 C082 D0 F6          BNE WA2
                1630 C084 18             CLC
                1640 C085 90 C0          BCC NEWONE
                1650 C087 8C 35 03 OTHER STY GUARDA
                1660 C08A AD 1B D4       LDA $D41B
                1670 C08D C9 80          CMP #128
                1680 C08F 90 05          BCC DECR
                1690 C091 A9 C8          LDA #$C8
                1700 C093 18             CLC
                1710 C094 90 02          BCC NEST
                1720 C096 A9 88    DECR  LDA #$88
                1730 C098 8D A4 C0 NEST  STA POSIT
                1740 C09B AC 35 03       LDY GUARDA
LOOP USED WHEN  1750 C09E B1 FB    WAIT  LDA ($FB),Y
SCREEN POSITION 1760 C0A0 D1 FD          CMP ($FD),Y
HAS BEEN COPIED.1770 C0A2 D0 AD          BNE SI
                1780 C0A4 C8       POSIT INY
MOVES LEFT/RIGHT1790 C0A5 CC 35 03       CPY GUARDA
AT RANDOM, UNTIL1800 C0A8 D0 F4          BNE WAIT
AVAILABLE POSITI1810 C0AA A5 FC          LDA $FC
IS FOUND        1820 C0AC 38             SEC
                1830 C0AD E9 04          SBC #4
                1840 C0AF A8             TAY
                1850 C0B0 A9 01          LDA #1
                1860 C0B2 99 36 03       STA TAB,Y
                1870 C0B5 18             CLC
                1880 C0B6 90 9D          BCC HERE2
                1885
RESTORE DEFAULT SCREEN
                1890 C0B8 A9 04    DONE  LDA #4
                1900 C0BA 8D 88 02       STA 648
ENABLE STOP-RESTORE
                1910 C0BD A9 ED          LDA #237
                1920 C0BF 8D 28 03       STA 808
  RESTORE ROM   1930 C0C2 A5 01          LDA 1
                1940 C0C4 09 01          ORA #1
                1950 C0C6 85 01          STA 1
  BACK TO BASIC 1960 C0C8 60             RTS
                1970 C0C9                TEMP = 820
                1980 C0C9                GUARDA = 821
                1990 C0C9                TAB = 822
```

Continued from page 50

mode. When powered up or reset, a menu is presented, and the function keys can be used to select "Configure Memory," "Normal Reset," "Utilities," and "Install Fastload." "Configure" is (sometimes) used preparatory to the backup process. The documentation does not explain this configuration process. Normal reset takes you to the familiar light blue on dark blue C-64 opening screen. The Utilities selection presents another menu with a number of very useful disk operations, including file and whole disk copy. These are for use with unprotected disks.

When Fastload is installed, a number of enhancements are made to the C-64's operation. With *Action Replay's* "standard" disk turbo, loads and saves occur at 6-7 times normal speed. Without the cartridge, turbo-saved programs will load slightly faster than normal. The Warp*25 Turbo, however, will load a previously warp-saved program in 6-7 seconds. These warped programs can only be loaded by Fastload—the cartridge must be plugged in—or by a special loader that the utilities menu allows you to save to the same disk.

A DOS wedge is enabled, permitting shorthand disk commands similar to those of DOS 5.1. Some useful direct mode only BASIC commands are provided, including OLD, DELETE, MERGE, APPEND, and AUTO. Notably absent is RENUMBER, but you can't have everything. A very powerful machine language monitor is also available. In addition to the usual MLM features, this one provides Compare, Transfer, and Number conversion. It can bank switch, accessing the C-64's hidden memory, and, for the adventurous hacker, it can perform its operations on the disk drive! A nice touch is the ability to scroll up and down through a disassembly.

Two negative points: The DOS wedge doesn't seem to allow pattern matching (*) on a directory, and always lists all names on a disk. When Fastload is enabled, direct mode always sets the character color to white, which causes the cursor to disappear if the screen is white, as it is on a SX-64.

All these features—Fastload, DOS wedge, BASIC enhancements, and the MLM—use no C-64 main memory. Like other "transparent" cartridges, however, Action Replay occupies both I/O blocks 1 and 2, and no other boards can be plugged into the expansion port. The cartridge has the intelligence to lock up the computer if an attempt is made to disassemble certain addresses in I/O 1 or 2.

One feature not tested for this review was the Tape Turbo. According to the instructions, tape I/O is speeded up 5-6 times using Fastload. Tape backups, on the other hand, load independent of the cartridge.

Backups

Unlike utilities that attempt to defeat the protection on a disk, and thus copy it, *Action Replay* is designed to "freeze" a program once it's in memory and then save a functioning, unprotected copy of the computer's memory. As always, some copy protected programs will be more resistant to copying than others. Extensive experimentation may be necessary to copy a particular program and confirm that the copy operates correctly. At this point we emphasize that a backup should be just that: a copy of a program owned and used by the legal purchaser of said program, as insurance against the loss or damage of the original.

In most cases, the copy process will be as follows: Choose normal reset from the *Action Replay* opening menu. Load the program you want to back up in the usual way. When the program is running, press the cartridge's Freeze button. A menu is presented with "backup" as one of the choices. If this is selected, the screen border changes color for a few seconds, indicating that the program is being compacted and otherwise prepared for saving. When this process is complete, another menu is displayed with various save options. A normal or standard save will save the computer's memory in a form that can be loaded (slowly), without the cartridge being present. Turbo save puts the program into *Action Replay's* fastload format, and Warp*25 is a superfast option. Fastload-formatted saves can be loaded without the cartridge, at slightly faster than normal speed. Warp saved programs can only be loaded by the cartridge or by the special loader mentioned earlier. So not only do you get to backup your vulnerable originals, but you get to speed up the loading time as well.

Some variation on this scenario may be required, depending on how well protected the program is. *Action Replay* provides enough flexibility to back up virtually any copy protected program. For an additional charge ($14.99), a "Parameter Support" disk is available for use on the more resistant programs.

A number of operations can be performed on a "frozen" program. Screens can be saved to tape or disk in *Koala, Blazing Paddles,* or several other formats. Hi-res and multicolor screens can be dumped to a printer. Text within a game can be altered or sprite collisions disabled, making the player invincible. (Where's the challenge in that?) Sprites can be saved from one game, then loaded into another. Since the MLM is available, the program can be disassembled and modified. Because of copyright laws, any modified versions of commercial software must be for the amusement and entertainment of the owner of the software. They can be neither sold nor given away. To do so is piracy.

Finally

Backing up protected software with *Action Replay* is relatively trouble free, less so than with disk-based nibblers and parameter copiers. With all its extras—BASIC enhancement, Fastload, etc.—*Action Replay* is well worth its $59.99 price tag.

Datel Computers, 3430 E. Tropicana Avenue, Unit #67, Las Vegas, NV 89121 (phone: 702-454-7700).

—Richard Curcio

Circle #223 on Reader Service Card

PROGRAMS WANTED

Send us your best BASIC or machine language programs for the C-64, C-128, or Amiga. If your work is accepted for publication in *Ahoy!* or *Ahoy!'s AmigaUser,* you'll be compensated for it at competitive industry rates. Along with the disk containing your program, include a printed introduction, a printout of the program, and a SASE if you want your submission returned.

Ahoy! Program Submissions Dept.
Ion International Inc.
45 West 34th Street—Suite 500
New York, NY 10001

SCREENSAVER64

For the C-64

By Richard Curcio

A routine to save and recall the C-64 text screen can be put to a number of uses. Help screens, low-res animation, and pseudo-windows are a few of the possibilities. *ScreenSaver64* will allow you to achieve these effects.



PHOTO: MICHAEL R. DAVILA

LOADER AND USAGE

The BASIC loader for *ScreenSaver* POKEs the machine language into RAM at 51200. The ML can be relocated by changing the variable SS in line 110. When the loader is RUN it reports the range of memory occupied and displays several SYS locations. These in effect are a "mini" jump table to perform the following actions:

```
SYS SS save screen information
SYS SS +3 recall screen information
SYS SS +6 clear links
```

The simplest operations are Save, which obviously saves the current text screen and color memory, and Recall, which recalls a previously saved screen to the current screen. In addition to the screen characters and colors, the routine stores the current cursor position, the current color, the reverse flag, and the screen line link table. This last item consists of 25 bytes at zero page locations 217-242 ($D9-$F2) that hold the high bytes of pointers to the start of each screen

BUY•SELL•TRADE BUY•SELL•TRADE BUY•SELL•TRADE

Computer Repeats, Inc.

AMAZING DEALS EVERYDAY!

TRADE-IN FOR ANYTHING WE SELL!

FREE SOFTWARE!

Amiga 500



$159 NEW

with trade-in of C128, 1571, 1902, Gemini10X, Xetec Intfc OR $225 with 64C, 1541, 1902, Gemini10X, Xetec Intfc $CALL for your system

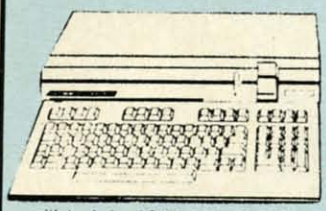
Used

C64 CPU	$119	C128 CPU	$199
Amiga 1000 CPU	$449	1541 Drive	$125
1571 Drive	$189	Modems from	$15
Enhancer 2000 Drive	$119	MPS 801 Printer	$72
1351 Mouse	$29	Diablo 630 Dsywhl	$249
Okimate color w/PIP	$99	C1702 Monitor	$135
C1802C Monitor	$149	Monitors from	$39
1530 Datasette	$20	Aprotek Interface	$29
Xetec Super Gold infc	$95	Software/Books from	$1

New

Amiga 2000 CPU	$1549	Excel 2001 128 Drive	$209
C1084 RGB Monitor	$299	A501 512K/clk	$149
A1010 Drive	$199	C1802C Monitor	$189
C1764 256K C64	$119	Avatex 1200HC	$99
C1670 Modem	$75	SmartLink 2400HC	$179
Star NX-1000 144cps	$189	Star NX-1000 Color	$249
128D CPU	$449	64C CPU	$159
Excelerator+ Drive	$159	Colt PC Turbo CPU	$719
1541-II Drive	$179	1571 Drive	$225

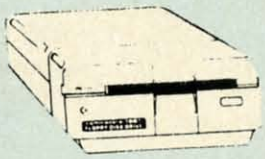
Commodore 128D



$249 NEW

with trade-in of C128, 1571 OR 64C, VIC-1525, 1541-II $CALL for your system

Commodore 1581



$79 NEW

with trade-in of1571 Drive $CALL for your system

Commodore 1670 Mdm



$39 NEW

with trade-in of MPS-801 Printer $CALL for your system

$Cash for your equipment
Thousands of software & book titles
Plus, MUCH, MUCH MORE!

2017 13th Street Suite A
Boulder, CO 80302

All references to trade-ins assume equipment to be in good working condition. Shipping/handling will be added to all prices. No additional charge for credit cards or COD. Mail order prices shown.

WE CHECK FOR CREDIT CARD THEFT!

1-303-939-8144

24 HR Modem Software Quotes: 1-303-939-8174

Authorized Dealers & Service for COMMODORE/AMIGA and ATARI ST/XL/XE Computers and Accessories.

VISA MASTERCARD DISCOVER AMERICAN EXPRESS COD

Circle #196 on Reader Service Card

line. (Ignoring bit 7, these bytes aren't absolute addresses, but are instead off-sets into the 16K video bank. However, when the screen is in the default VIC bank 0, these bytes appear to be the absolute addresses.) Bit 7 of each byte indicates whether that line is linked to the line above it. If bit 7 of a byte is clear (0), the line is said to be linked. This is what happens when PRINTing "wraps" from the right edge of the screen to the left edge of the line below. *ScreenSaver* includes an operation to un-link the screen lines by setting bit 7 of each link byte to "1". This is important when message boxes and such are to be printed over existing text.

ScreenSaver stores the screen information in the C-64's "hidden" memory. Location SS +9 holds the high byte of the start of storage. As written, this byte is 208 ($D0), corresponding to 53248 divided by 256, the start of the very well hidden RAM under I/O and character ROM at $D000-$DFFF. Since this area is 4K of RAM, it has enough room for two complete text screens with color memory and link information. By POKEing new values into SS +9, the routine can be made to store many more screens. Each new high byte should be on a 2K boundary, for example 208, 216, 224, 232, etc. Storage doesn't have to be in hidden memory. Care should be taken to ensure that a storage area doesn't conflict with another program's use of that location. *ScreenSaver* uses the contents of location 648 to determine where the active text screen is located, and can access a screen moved from its default location. Recalled screens, however, must be returned to the location they came from. Also, the routine cannot access an active screen in hidden RAM. Because the routine is switching the ROMs and I/O in and out, it should not be utilized with a program that uses Non Maskable Interrupts, such as modem and RS-232 programs.

To use this utility for "help" screens, print your information screen, then POKE SS +9, HS where HS is the high byte of the address to store the help screen, then SYS SS. When the need arises in your program to display the help screen, POKE SS +9, CS where CS is the high byte of the address to store the current screen, and save it with SYS SS. Then POKE SS +9, HS and recall the help screen with SYS SS +3. When the help screen is no longer needed, POKE SS +9, CS and recall the original screen with SYS SS +3 and the help screen disappears.



"But we have a special sale, Mr. Eastwood...are you *sure* you don't need an anti-glare screen?"

MESSAGE BOXES AND WINDOWS

Implementing windows like the C-128's on the C-64 is a major undertaking, requiring many pages of machine language. *ScreenSaver,* however, can perform a reasonable impersonation of such a facility. To display a message box, or a "pop-up menu" overlaying the existing text, the screen links must first be cleared. The operating system simply will not let you print over linked lines in the way that you intend. A neatly formatted box comes out very un-neat when linked lines are present.

The demo program contains a subroutine to print boxes based on C. Pickrell's program in the April 1988 *Tips Ahoy!* The program has been slightly enhanced by the use of a *Screen Wizardry* trick (February 1988) to position the cursor. An option to print the box in reverse is also included. When the routine is called, W is the width of the box, H is its height, D is down from the top of the screen, and R is columns right. The variable RV$ is the reverse flag and is either reverse on (CTRL-9) or reverse off (CTRL-0).

To simulate a window, first SYS SS to save the screen and links, then SYS SS +6 to clear the links. GOSUB to the box routine and print your message, menu, or whatever. To make this pseudo-window disappear, SYS SS +3 and the screen is restored to what it was before the box was displayed. To display a box, with no intention of recalling the text that it overwrites, first SYS SS +6 to un-link the screen lines, then call the box subroutine. Your display will be as neat as you envisioned it.

When using box routines like this, it's up to the user to make sure that the text within the box doesn't extend beyond the borders. LEN, POS, and other string functions will be useful in this regard. See *BASIC Obscurities,* April 1988 *Rupert Report.*

ROLL YOUR OWN

If you have some other memory mover that you prefer to use, it can duplicate *ScreenSaver's* operation by storing the screen and color memory in some location, and including a call that stashes the 25 link bytes somewhere. All that remains is to clear the link table before PRINTing any boxes. This can be done in BASIC with the statement

```
FOR I = 0 to 24: POKE 217 +I, PEEK (217 +I) OR 128: NEXT
```

This takes 25 jiffies—about half a second. If this is too slow for you, the ML to accomplish the same thing is quite short. POKE the following data into any free 12 bytes of memory:

```
DATA 162, 181, 217, 9, 128, 217, 202, 16, 247, 96
```

SEE PROGRAM LISTING ON PAGE 69

TIPS AHOY!

Continued from page 26

One might, for example, build an array of line numbers, then use the format GOTO.L(J) as a powerful version of ON-GOTO with destination lines limited only by available memory. When writing a text-based game, this could be a huge time-saver. By using a string array for the words, such as WD$(n), and a parallel numeric array for line numbers, e.g., WD(n), locating the correct string also gives the correct line. Then just GOTO.WD(n).

Although the default storage area for the ML is 4864, it's fully relocatable and can be put anywhere there are 44 free bytes. Once activated, only a cold reset will stop it. Fair warning: RENUMBER has no effect on this command, even if a valid line number follows it. Lastly, although it's unlikely to happen, if you get an UNDEFINED STATEMENT error, check the math. Some functions, such as exponents, give unexpected results. —Bob Renaud
Washington, MA

```
•1 INPUT"ML LOAD ADDRESS 4864[6"[LEFT]"]"
 ;X
•2 DATA A5,3D,D0,02,C6,3E,C6,3D,20,C9,03
•3 DATA C9,89,F0,06,C9,8D,F0,02,D0,13,20
•4 DATA 80,03,C9,2E,D0,0C,20,80,03,20,96
•5 DATA AF,20,0C,AF,4C,FB,59,6C,12,03,00
•6 FORJ=XTOX+43:READK$:K=DEC(K$):T=T+K:PO
KEJ,K:NEXT
•7 IFT<>4500THENPRINT"[RVSON]DATA ERROR!"
 :END
•8 POKE786,PEEK(768):POKE787,PEEK(769)
•9 POKE768,XAND255:POKE769,X/256:END
```

NO DIM WAITS

The vast expanse of variable memory available to C-128 users allows the creation of some truly prodigious data-arrays. When saving the array to disk, it's usually done as a sequential file, value by value. In one of my programs, I used the array DT(53,40,2), which if stored sequentially and starting at DT(0,0,0) would require saving 6642 values, permitting a nap while it's running. Being impatient, I wanted a faster way. Bless BASIC V7.0, there IS one.

First, DIMension all variables at the beginning of the program, and make the array variable the last one. Then, when it's time to save it, use a line similar to this one from my program:

```
BSAVE"DT",B1,P(POINTER(DT(0,0,0)))TO P(P
EEK(51)+256*PEEK(52))
```

This saves the entire array as a binary file (51,52 form the zero-page pointer for the last address for array variables). To load the file, use this format:

```
BLOAD"DT",B1,P(POINTER(DT(0,0,0)))
```

In each case, B1 specifies Bank 1, the variable memory area. Fair warning: *don't omit it.* If multiple arrays are in use, start at the POINTER to the first array, and it will save them all. Also note that if the zero values in the array aren't used, start the BSAVE and BLOAD using 1's rather than 0's (ex: DT(1,1,1)) which saves times and cuts the file length considerably. I use them, so I can't skip them, but starting at DT(1,1,1) would reduce the file to 4240 values. If possible, using integer arrays would make it far smaller still.

As an indication of reduced waiting time, using a 1571 my 131 block file SAVEs in one minute, 12 seconds (including SCRATCH time for the old file) and loads in 8 seconds. If you've had the displeasure of waiting and twiddling thumbs while your sequential file saves or loads, give this technique a shot. The difference is amazing.

—Bob Renaud
Washington, MA

SIMPLE SMOOTH SCROLL

This neat program lets you create a smooth sliding message like those used on Wall Street. Simply type in the program, run it, and type in your message when the word MESSAGE appears. SYS 52224 ($CC00) starts the scroll. For greater effects you can use your own character sets. Using SHIFTed characters creates reversed characters. To rewrite the message just run line 500. —Marcus Linkert
Glendale, NY

```
•10 REM   -SYS52224  TO START-
•20 REM  -SIMPLE SMOOTH SCROLL-
•30 REM  -BY MARCUS LINKERT-
•40 H$="0123456789ABCDEF"
•50 HD$=""
•60 V=52223
•70 READ HD$:V=V+1:PRINTV,HD$
•80 IF V=52435 THEN GOTO 500
•90 IF LEN(HD$)=0THEN PRINT"ERROR":END
•100 IFLEN(HD$)<>2THEN PRINT"ERROR":END
•110 H=0
•120 FORI=1TO16
•130 IFLEFT$(HD$,1)=MID$(H$,I,1)THENH=I:I
 =16
•140 NEXT I
•150 IF H=0 THEN POKE V,0:GOTO 70
•160 H=H-1
•170 L=0
•180 FORI=1TO16
•190 IF RIGHT$(HD$,1)=MID$(H$,I,1)THENL=I
 :I=16
•200 NEXTI
•210 IF L=0 THEN POKEV,0:GOTO 70
•220 L=L-1
•230 D=H*16+L
•240 POKEV,D
•250 GOTO 70
•260 DATA 78,A9,3E,8D,14,03,A9,CC,8D
•270 DATA 15,03,AD,11,D0,29,7F,8D,11
•280 DATA D0,A9,90,8D,12,D0,A9,81,8D
•290 DATA 19,D0,8D,1A,D0,AD,0E,DC,29
•300 DATA FE,8D,0E,DC,AD,16,D0,29,F7
•310 DATA 09,07,8D,16,D0,A9,E0,85,FB
```

TOTAL BACK UP POWER TAKES A QUANTUM LEAP!

ACTION REPLAY IV THE ULTIMATE UTILITIES/BACK-UP CARTRIDGE FOR THE 64/128

• Action Replay allows you to Freeze the action of any memory Resident Program and make a complete back-up to disk or tape – but thats not all . . . . Just compare these features

- Simple Operation: Just press the button at any point and make a complete back-up of any* memory resident program to tape or disk.
- Turbo Reload: All back-ups reload completely independantly of the cartridge at Turbo speed.
- Sprite Monitor: View the Sprite set from the frozen program – save the Sprite – transfer Sprites from one game to another. Wipe out Sprites, view the animation on screen. Create custom programs.
- Sprite Killer: Effective on most programs – make yourself invincible. Disable Sprite/Sprite/Backround collisions.
- Unique Picture Save: Freeze and save any Hires Screen to tape or disk. Saved in Koala, Blazing Paddles Format.

ONLY $59.99

POWERFUL DESIGN WITH ON BOARD LSI LOGIC PROCESSOR CHIP PLUS 40K OF ON BOARD ROM/RAM!

- Compactor: Efficient compacting techniques – 3 programs per disk side – 6 programs if you use both sides.
- Single File: All programs saved as a single file for maximum compatibility.
- Utility Commands: A host of additional commands: Autonum, Append, Old, Delete, Linesave, Printer Tester
- Screen Dump: Print out any Screen to Host or Printers. 16 Gray Scales, Double size print options.
- Unstoppable Reset: Reset button to Rectrieve System and Reset even so called Unstoppable Programs
- Fully Compatible: Works with 1541/C, 1581, 1571 and Datacassette with C64,128, 128D (in 64 Mode)
- Compatible: With Fast DOS and Turbo Rom Systems
- Disk Utilities: Fast Format, Directory, List, Run and many other key commands are operated by Function Keys
- Unique Restart: Remember all of these utilities are available at one time from an integrated operating system. A running programme can be Frozen to enter any Utility and the program is restarted at the touch of a key – without corruption.

LS1 Logic Processor: This is where Action Replay IV gets it's power. A special custom LS1 chip designed to process the logic necessary for this unmatched Freeze/Restart power. No other cartridge has this power!

UNIQUE FEATURES:

WARP 25

Loads 50K in under 5 seconds!!

The it true action replay features 'Warp 25' the world's fastest disk serial Turbo. A typical backup will reload in under 5 seconds.

● No additional hardware required ● No special formats ● Super reliable ● Remember this is not a system where files have to be converted – with action replay you simply save directly into Warp 25 status – reload in seconds. ● Backup all your existing programs to load at unbelievable speed!! ● Because AR4 has on board ram it can also load commercial disks directly at 25 times speed.

This is unique to Action Replay!!

● Warp Save/Load Available straight from Basic.

Plus unique Code Cracker Monitor

● Freeze any program and enter a full machine code monitor ● Full Monitor Features – Dissasemble, Hex, Find, Jump, Compare, Replace, Two Way Scroll, Full Disk Load/Save, Printer Support etc. In fact all usual monitor commands plus a few others. ● Because of Action Replay's on Board Ram the Frozen program can be looked at in it's ENTIRETY. – In it's Frozen state. That means Video Ram, Zero Page etc. and remember you see the code in it's Frozen state not in a Reset state as with competitors products. ● Restart the program at any point. ● No corruption ● An absolute must for the program Hacker – make changes and see your result's instantly!

Action Replay Graphics Support Disk

To help take advantage of action replay's unique power to freeze any screen and save it into your favourite graphics package we have prepared a suite of graphic support facilities.

● **Screen Viewer** View screens in a 'slide show' sequence – Joystick control simple to use. ● **Message Maker** Add scrolling messages to your saved screens with music, very easy to use. ● **Prosprite** A full sprite editor, modify/save/load feature, full edit facilities. ● **Zoon Lens** Explode sections of any saved screen to full size including Border – Superb fun and very useful.

ONLY $19.99

CENTRONICS PRINTER LEAD

- Take full advantage of Action Replay or Final Cartridge screen dump features with this centronics lead.
- Connects user port to any full size Epson compatible printer.

ONLY $18.99

SUPERCRUNCHER

- A utility to turn your Action Replay into a super powerful program compactor. Reduce programs by up to 50%! Save disk space and loading times. Can even further compact programs already crunched by Action Replay's own compactor.

ONLY $9.99

NOW WITH RAMLOADER™

- Not only can Action Replay load your backups at 25 times normal speed . . Now with the new RAMLOADER feature you can also load most of your commercial originals also at 25 times faster!
- Making use of our special LSI logic processor and 8K of onboard Ram Action Replay now offers the world's fastest Disk Serial Turbo.

ORDERS ONLY 1-800-782-9110

NOTE: – Technical or any other type of Enquiry cannot be answered by the staff on this number.

TECHNICAL SUPPORT CUSTOMER SERVICE (702) 454-7700

MONDAY THRU SATURDAY 9am to 5pm PACIFIC TIME
EXTRA SHIPPING REQD. OUTSIDE CONTINENTAL U.S.

DATEL COMPUTERS



FINAL CARTRIDGE III

- Give your C64/128 an "Amiga Look-Alike" environment. Pull down windows/icons.
- PLUS a huge range of utilities all built into this one cartridge . . . including:
- Freezer option to freeze and copy most any memory resident program.
- Full machine code monitor with all the usual commands and more.
- Unique picture print dump – compressed/enlarged.

Plus other effects.

- Fast loader – loads commercial software at up to 15 times normal speed.
- Range of desk top type tools – clock, calculator, desktools etc. etc.
- Final Cartridge 3 is a superb utilities cartridge with an added bonus of a freezer function.

ONLY $54.99

TOOLKIT IV

The ultimate disk toolkit for the 1540/1541

- A disk toolkit is an absolute must for the serious disk hacker. Toolkit IV has more features than most for less.
- DISK DOCTOR V2 – Read and write any track and sector including extra and renumbered tracks. Repair damaged sectors. Look underneath read errors.
- HEADER/GAP EDITOR – Decodes and displays ALL header information including off bytes and header gap. Rewrite the entire header and header gap. Renumber sectors. Also edit any sector tail gap.
- DISK LOOK – Sort directory. Recover lost files. Display file start/end addresses. Disassemble any file program directly from the disk to SCREEN or PRINTER including undocumented opcodes. Edit Bam. Much, much more.
- FILE COMPACTOR – Can compact machine programs by up to 50%. Saves disk space. Compacted programs run as normal.
- FAST DISK COPY – Copy an entire disk in 2 minutes or less using single 1541.
- FAST FILE COPY – Selective file copy. Works at up to 6 times normal speed.
- FORMATTER – 10 second format an entire disk or format any individual track or half track 0 to 41. Redefine any of 30 parameters to create or recreate unique disk formats.
- ERROR EDIT – Quickly find and recreate all read errors including extra and renumbered tracks or sectors and half tracks from 0 to 41. Even recreates data under errors and allows you to redefine any necessary parameters.

ONLY $14.99



DIGITAL SOUND SAMPLER

- The new sampler allows you to record any sound digitally into memory and then replay it with astounding effects.
- Playback forwards/backwards with echo/reverb/ring modulation.
- Full 8 bit D to A & ADC conversion.
- Midi compatible with suitable Midi interface. (see Ad')
- Full sound editing and realtime effects menu with waveforms.
- Powerful sequencer plus load/save functions.
- Line In/Mic In/Line Out/Feedback controls.
- Complete hardware/software package.

ONLY $89.99



MIDI 64

- Full specification MIDI interface at a realistic Price.
- MIDI IN - MIDI OUT - MIDI THRU
- Compatible with most leading MIDI software.

ONLY $49.99

TURBO ROM II



Turbo Rom II is a replacement for the actual kernal inside your 64. It provides superfast load/save routines.

- Loads/Saves most programs at 5-6 times normal speed.
- Improved DOS support including 10 sec format.
- Programmed function keys:- load, directory, old, etc.
- Return to normal kernal at flick of a switch.
- FCOPY – 250 block file copier.
- FLOAD – special I/O loader.
- Plus lots more.
- Fitted in minutes – no soldering usually required. (On some 64's the old ROM may have be desoldered).

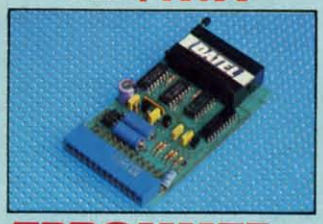
ONLY $24.99



256K SUPEROM EXPANDER

- Now you can select from any of 8 32K EPROMs
- 8 sockets to accept upto a 32K EPROM in each.
- On board operating system – no programs to load.
- Program your own EPROMs using our EPROM programmer.
- No need to have loads of cartridges – just make a selection from the Superom menu.
- Directory of utilities on power up.
- Fully menu driven on power up.
- Select any slot under software controls.
- Unique EPROM generator feature will take your own programs – basic or m/c and turn them into autostart EPROMs. (EPROM burner required).
- Accepts 2764/27128/27256 EPROMs.

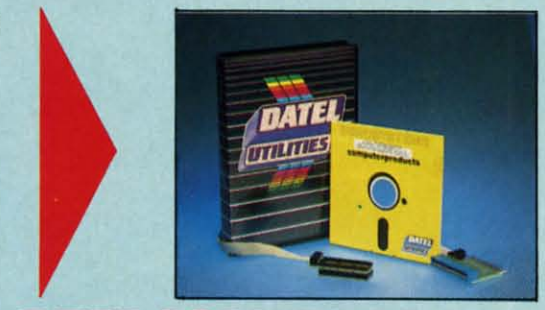
ONLY $49.99



EPROMMER 64™

- A top quality, easy to use EPROM programmer for the 64/128.
- Fully menu driven software/hardware package makes programming/reading/ verifying/ copying EPROM's simplicity itself.
- Will program 27256 chips, 12.5, 21 or 25 volts.
- Fits into user port for maximum compatibility with cartridges/Superom Board etc.
- Full feature system – all functions covered including device check/verify.
- We believe Eprommer 64 is the most comprehensive, most friendly and best value for money programmer available for the 64/128.
- Ideal companion for Superom Board. Cartridge development System, our kernal expanders or indeed any ERPOM base project.
- Comes complete with instructions – plus the cartridge handbook.

ONLY $69.99 COMPLETE



DEEP SCAN BURST NIBBLER™

- The most powerful disk nibbler available anywhere, at any price!
- Burst Nibbler is actually a two part system – a software package **and** a parallel cable to connect the 1541/1570/1571 to 64/128 (state type).
- What gives Burst Nibbler its power? Conventional nibblers have to decode the data from the disk before it can transfer it using the serial bus – when non standard data is encountered they are beat. Burst Nibbler transfers data as raw GCR code via the parallel cable without the need to decode it so you get a perfect copy of the original.

- Will nibble upto 41 tracks. - Copy a whole disk in under 2 minutes. - Full instructions.
- Regular updates – we always ship the latest. - Fitted in minutes – no soldering usually required.
- Full or $\frac{1}{2}$ tracks. - No need to buy parallel cable if you have Professional DOS etc.
- Cable has throughbus extension for other add ons.

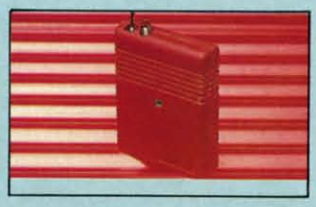
ONLY $39.99 COMPLETE

SOFTWARE ONLY $19.99 CABLE ONLY $19.99

BURST NIBBLER PARAMETER DISK

- Burst Nibbler is the most powerful Nibbler around – but even the best can be better. - This disk contains dozens of parameters specially written for the protection schemes impossible to Nibble. These are mainly 'V-max' and 'Rapidlock' and include titles such as 'Defender of the Crown,' Gauntlet etc. - Regularly updated to include any new titles. - This disk is by no means a necessity – the standard Burst Nibbler will copy 95% of software as is – if you want to go to the limits, this is the product for you!

ONLY $14.99



SMART CART

- NOW YOU CAN HAVE A 32K CARTRIDGE THAT YOU PROGRAM LIKE RAM THEN ACTS LIKE ROM!
- 32K pseudo ROM – battery backed to last up to 2 years (lithium battery).
- Simply load the program you require – then flick the switch. The cartridge then acts like a ROM cartridge and can even be removed.
- Make your own cartridges – even auto start types, without the need for an Eprom burner.
- Can be switched in/out via software.
- I/O2 slot open for special programming techniques.

ONLY $59.99



DUPLIKATOR

- Duplikator is a mass disk copier ideal for clubs, user groups etc.
- Comes with 256K on board RAM and it's own built-in operating system – no software to load.
- Makes entire backups in 8 seconds!!
- Multiple copies from one original – over 250 disks per hour. Full verify option.
- Copies upto 40 tracks and can cope with standard disk errors 21-29.
- The most price effective method of mass duplication available.

ONLY $189.99



EXTERNAL 3.5" DISK DRIVE

- Slimline extra low profile unit – only 6" long!
- Top quality NEC drive mechanism. - Throughport allows daisychaining other drives. - A superbly styled case finished in amiga colours. - Fully compatible. - 1 meg unformatted capacity. - Good length cable for positioning on your desk etc. - Complete – no more to buy.

ONLY $169.99 SINGLE

ONLY $299.99 DUAL



MIDIMASTER

- Full Midi Interface for A500/2000/1000 (Please state model).
- Compatible with most leading Midi packages (inc. D/Music).
- Midi In – Midi Out x 3 – Midi Thru.
- Fully Opto Isolated/Full MIDI.

ONLY $59.99

VISA® MasterCard

Add $4.00 Shipping/Handling

CHECKS/MONEY ORDER/CODS ACCEPTED

DATEL COMPUTERS
3430 E. TROPICANA AVENUE, UNIT #67, LAS VEGAS, NV 89121

```
•320 DATA A9,CC,85,FC,C6,FB,58,60,AD
•330 DATA 19,D0,29,01,F0,23,C6,FD,10
•340 DATA 04,A9,07,85,FD,C6,FD,AD,16
•350 DATA D0,29,F0,05,FD,8D,16,D0,A9
•360 DATA 79,8D,14,03,A9,CC,8D,15,03
•370 DATA A9,A4,8D,12,D0,A9,81,8D,19
•380 DATA D0,8D,1A,D0,AD,0D,DC,68,A8
•390 DATA 68,AA,68,40,AD,19,D0,29,01
•400 DATA F0,48,AD,16,D0,09,07,8D,16
•410 DATA D0,A5,FD,D0,2D,A8,C8,B9,08
•420 DATA 06,88,99,08,06,4C,9A,CC,EA
•430 DATA EA,C8,C0,28,D0,EE,A0,00,E6
•440 DATA FB,D0,02,E6,FC,B1,FB,D0,0B
•450 DATA A9,E0,85,FB,A9,CC,85,FC,4C
•460 DATA A7,CC,8D,2F,06,A9,3E,8D,14
•470 DATA 03,A9,CC,8D,15,03,A9,90,8D
•480 DATA 12,D0,A9,81,8D,19,D0,8D,1A
•490 DATA D0,4C,31,EA,00
•500 REM -MESSAGE WRITER-
•510 A=52448:POKE204,0:PRINT"MESSAGE:"
•520 GET A$:IF A$="" THEN 520
•530 IF A$=CHR$(13) THEN POKEA,0:END
•540 IF ASC(A$)<65 THEN PRINTA$;:POKEA,AS
 C(A$):A=A+1:GOTO 520
•550 PRINTA$;:POKEA,ASC(A$)-64:A=A+1:GOTO
  520
```

C-128 EASY MERGE

While looking at a memory map of the C-128, I discovered a method of merging two programs without using a bunch of PEEKs and POKEs.

First you must create a sequential file of the program you want to merge with the main program. This is done with the following commands:

```
OPEN 8,8,8,"filename.ASC,S,W":CMD8:LIST:
PRINT#8:CLOSE8
```

Then load the main program and type:

```
OPEN 8,8,8,"filename.ASC":BANK15:SYS6547
8,0,8:CLOSE8
```

The SYS is a standard Commodore kernal jump which sets a specified channel for input.

You may get a Syntax error but ignore it. This is a true merge (lines with same numbers will be replaced).

—Steve Stutts
Loretto, TN

QUOTE SWITCHER

Quote mode, the strange transformation that comes over your Commodore 64 when you press SHIFT-2, can be very useful for entering certain cursor positioning and control commands that would otherwise only be available through tedious CHR$ codes. However, it can become extremely frustrating, especially when editing PRINT statements. To avoid getting high blood pressure from using quote mode, simply run this short BASIC program. It POKEs a short machine language program into memory locations 49152-49189 and enables it. Now, to enter quote mode, just press the f1 key. To get out of quote mode, press f3. If at some point during your programming, you press RUN STOP/RESTORE, you will have to enter SYS 49152 in order to reenable *Quote Switcher.*

—Jeremy Baer
Mulino, OR

```
•5 T=0:SA=49152
•10 FOR C=SATOSA+37:READD:T=T+D:POKEC,D:N
 EXT
•15 IF T<>4252THENPRINT"[CLEAR][BLACK]ERR
 OR IN DATA STATEMENTS!":STOP
•20 SYS 49152
•25 PRINT"[CLEAR][CYAN]QUOTE SWITCHER INS
 TALLED":STOP
•49152 DATA 120,169,13,141,20,3
•49158 DATA 169,192,141,21,3,88
•49164 DATA 96,165,197,201,5,208
•49170 DATA 7,169,0,133,212,76
•49176 DATA 34,192,201,4,208,4
•49182 DATA 169,1,133,212,76,49
•49188 DATA 234,186
```

AUTO INSERT

What Commodore user hasn't typed a command over screen info without thinking, with a SYNTAX ERROR for the effort? This ML routine (for the C-128 only) all but eliminates this nuisance. After any direct-mode operation, e.g., a program edit, a line-insert leaves the cursor flashing in an empty line, and a bell dings to say that it's ready for more input.

The program asks for a load address. Any RAM area with 28 free bytes can be used. Once loaded, key F8 (or POKE250,1) activates it and key F6 (or POKE250,0) turns it off. Delete line 5 if this will interfere with needed F-key definitions.

Only a cold reset will disable it, whence a SYS call restarts it. The program will tell you what to use.

—Bob Renaud
Washington, MA

```
•1 INPUT"[CLEAR]ML ADDRESS";A:B=A+27:C=A+
 11
•2 FORJ=ATOB:READD:V=V+D:POKEJ,D:NEXT
•3 IFV<>2744THENPRINT"[DOWN][RVSON]DATA E
 RROR!":END
•4 L%=CAND255:H%=C/256:POKEA+1,L%:POKEA+6
 ,H%:SYSA
•5 KEY6,"POKE250,0"+CHR$(13):KEY8,"POKE25
 0,1"+CHR$(13)
•6 PRINT"AFTER RESET, ENTER 'SYS"A"[LEFT]
 '":END
•7 DATA 169,198,141,002,003,169,077
•8 DATA 141,003,003,096,165,250,208
•9 DATA 003,076,198,077,032,129,146
•10 DATA 027,073,007,000,076,198,077
```

PROGRAM LISTINGS

Attention new *Ahoy!* readers! You must read the following information very carefully prior to typing in programs listed in *Ahoy!* Certain Commodore characters, commands, and strings of characters and commands will appear in a special format. Follow the instructions and listings guide on this page.

On the following pages you'll find several programs that you can enter on your Commodore computer. But before doing so, read this entire page carefully.

To insure clear reproductions, *Ahoy!'s* program listings are generated on a daisy wheel printer, incapable of printing the commands and graphic characters used in Commodore programs. These are therefore represented by various codes enclosed in brackets [ ]. For example: the SHIFT CLR/HOME command is represented onscreen by a heart . The code we use in our listings is [CLEAR]. The chart below lists all such codes which you'll encounter in our listings, except for one other special case.

The other special case is the COMMODORE and SHIFT characters. On the front of most keys are two symbols. The symbol on the left is obtained by pressing that key while holding down the COMMODORE key; the symbol on the right, by pressing that key while holding down the SHIFT key. COMMODORE and SHIFT characters are represented in our listings by a lower-case "s" or "c" followed by the symbol of the key you must hit. COMMODORE J, for example, is represented by [c J], and SHIFT J by [s J].

Additionally, any character that occurs more than two times in a row will be displayed by a coded listing. For example, [3 "[LEFT]"] would be 3 CuRSoR left commands in a row, [5 "[s EP]"] would be 5 SHIFTed English Pounds, and so on. Multiple blank spaces will be noted in similar fashion: e.g., 22 spaces as [22 " "].

Sometimes you'll find a program line that's too long for the computer to accept (C-64 lines are a maximum of 80 characters, or 2 screen lines long; C-128 lines, a maximum of 160 characters, 2 or 4 screen lines in 40 or 80 columns respectively). To enter these lines, refer to the *BASIC Command Abbreviations Appendix* in your User Manual.

On the next page you'll find our *Bug Repellent* programs for the C-128 and C-64. The version for your machine will help you proofread programs after typing them. (Please note: the *Bug Repellent* line codes that follow each program line, in the whited-out area, should *not* be typed in. See instructions preceding each program.)

On the second page following you will find *Flankspeed*, our ML entry program, and instructions on its use.

Call *Ahoy!* at 212-239-6089 with any problems (if busy or no answer after three rings, call 212-239-0855).

WHEN YOU SEE	IT MEANS	YOU TYPE		YOU WILL SEE
[CLEAR]	Screen Clear	SHIFT	CLR/HOME	
[HOME]	Home		CLR/HOME	
[UP]	Cursor Up	SHIFT	↑ CRSR ↓	
[DOWN]	Cursor Down		↑ CRSR ↓	
[LEFT]	Cursor Left	SHIFT	← CRSR →	
[RIGHT]	Cursor Right		← CRSR →	
[SS]	Shifted Space	SHIFT	Space	
[INSERT]	Insert	SHIFT	INST/DEL	
[DEL]	Delete		INST/DEL	
[RVSON]	Reverse On	CNTRL	9	
[RVSOFF]	Reverse Off	CNTRL	0	
[UPARROW]	Up Arrow		↑	
[BACKARROW]	Back Arrow		←	
[PI]	PI		π	
[EP]	English Pound		£	

WHEN YOU SEE	IT MEANS	YOU TYPE	YOU WILL SEE
[BLACK]	Black	CNTRL 1	
[WHITE]	White	CNTRL 2	
[RED]	Red	CNTRL 3	
[CYAN]	Cyan	CNTRL 4	
[PURPLE]	Purple	CNTRL 5	
[GREEN]	Green	CNTRL 6	
[BLUE]	Blue	CNTRL 7	
[YELLOW]	Yellow	CNTRL 8	
[F1]	Function 1	F1	
[F2]	Function 2	SHIFT F1	
[F3]	Function 3	F3	
[F4]	Function 4	SHIFT F3	
[F5]	Function 5	F5	
[F6]	Function 6	SHIFT F5	
[F7]	Function 7	F7	
[F8]	Function 8	SHIFT F7	

BUG REPELLENT FOR THE 64 & 128 By BUCK CHILDRESS

Please note: the *Bug Repellent* programs listed here are for *Ahoy!* programs published from the May 1987 issue onward! For older programs, use the older version.

Type in, save, and run *Bug Repellent*. You'll be asked if you want automatic saves to take place. If so, you're prompted for the device, DISK (D) or TAPE (T). You then pick a starting file number, 0 through 99. Next, you enter a name, up to 14 characters long. At this point, *Bug Repellent* verifies your entries and gives you a chance to change them if you want. If no changes are needed, *Bug Repellent* activates itself. (Pressing RETURN without answering the prompts defaults to disk drive and begins your files with "00BACKUP".)

Type NEW and begin entering an *Ahoy!* program. As you enter program lines and press RETURN, a *Bug Repellent* code appears at the top of your screen. If it doesn't match the code in the program listing, an error exists. Correct the line and the codes will match.

If used, automatic saves take place every 15 minutes. When the RETURN key is pressed on a program line, the screen changes color to let you know that a save will begin in about three seconds. You may cancel the save by pressing the RUN STOP key. The file number increments after each save. It resets to 00 if 99 is surpassed. After saving, or cancelling, the screen returns to its original color and the timer resets for 15 minutes.

When you've finished using *Bug Repellent*, deactivate it by typing SYS 49152 [RETURN] for the Commodore 64 or SYS 4864 [RETURN] for the Commodore 128.

C-64 BUG REPELLENT

```
·10 PRINTCHR$(147)"LOADING AND CHECKING THE DATA[3"."]":J
=49152
·20 FORB=0TO11:READA:IFA<0ORA>255THEN40
·30 POKEJ+B,A:X=X+A:NEXTB:READA:IFA=XTHEN50
·40 PRINT:PRINT"ERROR IN DATA LINE:"PEEK(64)*256+PEEK(63)
:END
·50 X=0:J=J+12:IFJ<49456THEN20
·60 POKE198,0:POKE49456,0:A$="Y":B$=A$:C$="D":D$="DISK":D
=8:PRINTCHR$(147)
·70 INPUT"DO YOU WANT AUTOMATIC SAVES (Y/N)";A$:PRINT:IFA
$="Y"THEN90
·80 PRINT"NO AUTOMATIC SAVES[3"."]":GOTO150
·90 POKE49456,1:INPUT"DISK OR TAPE (D/T)";C$:IFC$<>"D"THE
ND=1:D$="TAPE"
·100 POKE49457,D:D$=D$+" DRIVE":PRINT:INPUT"FILE NUMBER (
0-99)";N
·110 N$=RIGHT$(STR$(N),2):IFN<10THENN$=CHR$(48)+CHR$(N+48
)
·120 F$="BACKUP":PRINT:INPUT"FILENAME";F$:F$=N$+LEFT$(F$,
14):L=LEN(F$)
·130 POKE49458,L:FORJ=1TOL:POKE49458+J,ASC(MID$(F$,J,1)):
NEXTJ:PRINT
·140 PRINT"SAVING DEVICE ** "D$:PRINT"STARTING WITH ** "F
$
·150 PRINT:INPUT"IS THIS CORRECT (Y/N)";B$:IFB$<>"Y"THEN6
0
·160 POKE770,131:POKE771,164:SYS49152:END
·170 DATA169,79,32,210,255,162,38,160,192,204,3,3,1507
·180 DATA208,10,162,131,160,164,169,70,32,210,255,44,1615
·190 DATA169,78,32,210,255,142,2,3,140,3,3,76,1113
·200 DATA36,193,32,96,165,134,122,132,123,32,115,0,1180
·210 DATA170,240,243,162,255,134,58,144,3,76,150,164,1799
·220 DATA32,167,169,32,121,165,173,0,2,240,5,169,1215
·230 DATA79,141,2,3,76,162,164,169,0,133,2,133,1064
·240 DATA251,133,252,133,254,24,101,20,69,254,230,254,197
5
·250 DATA24,101,21,69,254,170,230,254,164,252,185,0,1724
·260 DATA2,133,253,201,34,208,6,165,2,73,255,133,1465
·270 DATA2,201,32,208,4,165,2,240,8,138,24,101,1125
·280 DATA253,69,254,170,44,198,254,230,252,164,253,208,23
49
·290 DATA213,138,41,240,74,74,74,74,24,105,129,141,1327
·300 DATA44,193,138,41,15,24,105,129,141,45,193,162,1230
·310 DATA0,189,43,193,240,12,157,0,4,173,134,2,1147
·320 DATA157,0,216,232,208,239,169,38,141,2,3,173,1578
·330 DATA48,193,240,23,165,161,201,212,176,4,165,160,1748
·340 DATA240,13,238,32,208,160,0,32,225,255,208,6,1617
·350 DATA32,33,193,76,38,192,232,208,242,200,208,239,1893
·360 DATA32,68,229,169,0,168,174,49,193,32,186,255,1555
·370 DATA173,50,193,162,51,160,193,32,189,255,169,43,1670
·380 DATA166,45,164,46,32,216,255,162,1,189,51,193,1520
·390 DATA168,200,152,201,58,144,2,169,48,157,51,193,1543
·400 DATA201,48,208,3,202,16,234,32,33,193,76,116,1362
·410 DATA164,206,32,208,169,0,170,168,76,219,255,160,1827
·420 DATA1,1,160,0,0,65,72,79,89,33,0,0,500
```

C-128 BUG REPELLENT

```
·10 PRINTCHR$(147)"LOADING AND CHECKING THE DATA[3"."]":J
=4864
·20 FORB=0TO11:READA:IFA<0ORA>255THEN40
·30 POKEJ+B,A:X=X+A:NEXTB:READA:IFA=XTHEN50
·40 PRINT:PRINT"ERROR IN DATA LINE:"PEEK(66)*256+PEEK(65)
:END
·50 X=0:J=J+12:IFJ<5213THEN20
·60 POKE208,0:POKE5213,0:A$="Y":B$=A$:C$="D":D$="DISK":D=
8:PRINTCHR$(147)
·70 INPUT"DO YOU WANT AUTOMATIC SAVES (Y/N)";A$:PRINT:IFA
$="Y"THEN90
·80 PRINT"NO AUTOMATIC SAVES[3"."]":GOTO150
·90 POKE5213,1:INPUT"DISK OR TAPE (D/T)";C$:IFC$<>"D"THEN
D=1:D$="TAPE"
·100 POKE5214,D:D$=D$+" DRIVE":PRINT:INPUT"FILE NUMBER (0
-99)";N
·110 N$=RIGHT$(STR$(N),2):IFN<10THENN$=CHR$(48)+CHR$(N+48
)
·120 F$="BACKUP":PRINT:INPUT"FILENAME";F$:F$=N$+LEFT$(F$,
14):L=LEN(F$)
·130 POKE5215,L:FORJ=1TOL:POKE5215+J,ASC(MID$(F$,J,1)):NE
XTJ:PRINT
·140 PRINT"SAVING DEVICE ** "D$:PRINT"STARTING WITH ** "F
$
·150 PRINT:INPUT"IS THIS CORRECT (Y/N)";B$:IFB$<>"Y"THEN6
0
·160 POKE770,198:POKE771,77:SYS4864:END
·170 DATA32,58,20,169,41,162,19,236,3,3,208,4,955
·180 DATA169,198,162,77,141,2,3,142,3,3,224,19,1143
·190 DATA208,7,32,125,255,79,78,0,96,32,125,255,1292
·200 DATA79,70,70,0,96,162,0,134,251,189,0,2,1053
·210 DATA240,19,201,48,144,9,201,58,176,5,133,251,1485
·220 DATA232,208,238,134,252,165,251,208,3,76,198,77,2042
·230 DATA169,0,166,235,164,236,133,253,133,254,142,47,193
2
·240 DATA20,140,48,20,24,101,22,69,254,230,254,24,1206
·250 DATA101,23,69,254,170,230,254,164,252,185,0,2,1704
·260 DATA133,251,201,34,208,6,165,253,73,255,133,253,1965
·270 DATA201,32,208,4,165,253,240,8,138,24,101,251,1625
·280 DATA69,254,170,44,198,254,230,252,164,251,208,213,23
07
·290 DATA138,41,240,74,74,74,74,24,105,65,141,88,1138
·300 DATA20,138,41,15,24,105,65,141,89,20,32,79,769
·310 DATA20,189,85,20,240,6,32,210,255,232,208,245,1742
·320 DATA174,47,20,172,48,20,24,32,240,255,173,93,1298
·330 DATA20,240,27,165,161,201,212,176,4,165,160,240,1771
·340 DATA17,32,65,20,238,32,208,238,1,214,32,225,1322
·350 DATA255,208,6,32,49,20,76,198,77,232,208,242,1603
·360 DATA200,208,239,32,66,193,173,95,20,162,96,160,1644
·370 DATA20,32,189,255,169,0,170,32,104,255,169,0,1395
·380 DATA174,94,20,168,32,186,255,169,45,174,16,18,1351
·390 DATA172,17,18,32,216,255,162,1,189,96,20,168,1346
·400 DATA200,152,201,58,144,2,169,48,157,96,20,201,1448
·410 DATA48,208,3,202,16,234,32,49,20,141,0,2,955
·420 DATA76,183,77,58,59,32,65,20,206,32,208,206,1222
·430 DATA1,214,169,0,170,168,76,219,255,32,79,20,1403
·440 DATA169,26,141,0,214,173,0,214,16,251,96,162,1462
·450 DATA0,142,0,255,96,19,18,32,32,32,32,146,804
·460 DATA0,1,0,0,65,72,79,89,33,0,0,0,339
```

FLANKSPEED FOR THE C-64 By GORDON F. WHEAT

Flankspeed will allow you to enter machine language *Ahoy!* programs without any mistakes. Once you have typed the program in, save it for future use. While entering an ML program with *Flankspeed* there is no need to enter spaces or hit the carriage return. This is all done automatically. If you make an error in a line a bell will ring and you will be asked to enter it again. To LOAD in a program Saved with *Flankspeed* use LOAD "name",1,1 for tape, or LOAD "name",8,1 for disk. The function keys may be used after the starting and ending addresses have been entered.

f1—SAVEs what you have entered so far.

f3—LOADs in a program worked on previously.

f5—To continue on a line you stopped on after LOADing in the previous saved work.

f7—Scans through the program to locate a particular line, or to find out where you stopped the last time you entered the program. It temporarily freezes the output as well.

```
·100 POKE53280,12:POKE53281,11                                    OP
·105 PRINT"[CLEAR][c 8][RVSON][15" "]FLANKSPEED[15" "]";          FP
·110 PRINT"[RVSON][5" "]MISTAKEPROOF ML ENTRY PROGRAM[6" "
]"                                                                JP
·115 PRINT"[RVSON][9" "]CREATED BY G. F. WHEAT[9" "]"             FA
·120 PRINT"[RVSON][3" "]COPR. 1987, ION INTERNATIONAL INC.
[3" "]"                                                           AJ
·125 FORA=54272TO54296:POKEA,0:NEXT                               ND
·130 POKE54272,4:POKE54273,48:POKE54277,0:POKE54278,249:PO
KE54296,15                                                        NP
·135 FORA=680TO699:READB:POKEA,B:NEXT                             FL
·140 DATA169,251,166,253,164,254,32,216,255,96                    FF
·145 DATA169,0,166,251,164,252,32,213,255,96                      EK
·150 B$="STARTING ADDRESS IN HEX":GOSUB430:AD=B:SR=B              KP
·155 GOSUB480:IFB=0THEN150                                        OE
·160 POKE251,T(4)+T(3)*16:POKE252,T(2)+T(1)*16                    AM
·165 B$="ENDING ADDRESS IN HEX":GOSUB430:EN=B                     PE
·170 GOSUB470:IFB=0THEN150                                        PG
·175 POKE254,T(2)+T(1)*16:B=T(4)+1+T(3)*16                        GM
·180 IFB>255THENB=B-255:POKE254,PEEK(254)+1                       HG
·185 POKE253,B:PRINT                                              EC
·190 REM  GET HEX LINE                                            ED
·195 GOSUB495:PRINT": [c P][LEFT]";:FORA=0TO8                     KD
·200 FORB=0TO1:GOTO250                                            IH
·205 NEXTB                                                        IJ
·210 A%(A)=T(1)+T(0)*16:IFAD+A-1=ENTHEN340                        FA
·215 PRINT" [c P][LEFT]";                                         EG
·220 NEXTA:T=AD-(INT(AD/256)*256):PRINT" "                        II
·225 FORA=0TO7:T=T+A%(A):IFT>255THENT=T-255                       GL
·230 NEXT                                                         GI
·235 IFA%(8)<>TTHENGOSUB375:GOTO195                               FL
·240 FORA=0TO7:POKEAD+A,A%(A):NEXT:AD=AD+8:GOTO195                IM
·245 REM    GET HEX INPUT                                         PA
·250 GETA$:IFA$=""THEN250                                         GA
·255 IFA$=CHR$(20)THEN305                                         GO
·260 IFA$=CHR$(133)THEN535                                        LM
·265 IFA$=CHR$(134)THEN560                                        IG
·270 IFA$=CHR$(135)THENPRINT" ":GOTO620                           HO
·275 IFA$=CHR$(136)THENPRINT" ":GOTO635                           HE
·280 IFA$>"@"ANDA$<"G"THENT(B)=ASC(A$)-55:GOTO295                 MI
·285 IFA$>"/"ANDA$<":"THENT(B)=ASC(A$)-48:GOTO295                 DJ
·290 GOSUB415:GOTO250                                             JA
·295 PRINTA$"[c P][LEFT]";                                        PK
·300 GOTO205                                                      FA
·305 IFA>0THEN320                                                 BI
·310 A=-1:IFB=1THEN330                                            BB
·315 GOTO220                                                      FA
·320 IFB=0THENPRINTCHR$(20);CHR$(20);:A=A-1                       BF
·325 A=A-1                                                        FK
·330 PRINTCHR$(20);:GOTO220                                       PH
·335 REM LAST LINE                                                CP
·340 PRINT" ":T=AD-(INT(AD/256)*256)                              KH
·345 FORB=0TOA-1:T=T+A%(B):IFT>255THENT=T-255                     OD
·350 NEXT                                                         OB
·355 IFA%(A)<>TTHENGOSUB375:GOTO195                               LH
·360 FORB=0TOA-1:POKEAD+B,A%(B):NEXT                              BO
·365 PRINT:PRINT"YOU ARE FINISHED!":GOTO535                       MB
·370 REM BELL AND ERROR MESSAGES                                  LM
·375 PRINT:PRINT"LINE ENTERED INCORRECTLY":PRINT:GOTO415          JK
·380 PRINT:PRINT"INPUT A 4 DIGIT HEX VALUE!":GOTO415              PG
·385 PRINT:PRINT"ENDING IS LESS THAN STARTING!":B=0:GOTO41
5                                                                 IK
·390 PRINT:PRINT"ADDRESS NOT WITHIN SPECIFIED RANGE!":B=0:
GOTO415                                                           HK
·395 PRINT:PRINT"NOT ZERO PAGE OR ROM!":B=0:GOTO415               DM
·400 PRINT"?ERROR IN SAVE":GOTO415                                JK
·405 PRINT"?ERROR IN LOAD":GOTO415                                IO
·410 PRINT:PRINT:PRINT"END OF ML AREA":PRINT                      JO
·415 POKE54276,17:POKE54276,16:RETURN                             BF
·420 OPEN15,8,15:INPUT#15,A,A$:CLOSE15:PRINTA$:RETURN             DH
·425 REM GET FOUR DIGIT HEX                                       IM
·430 PRINT:PRINTB$;:INPUTT$                                       OL
·435 IFLEN(T$)<>4THENGOSUB380:GOTO430                             JD
·440 FORA=1TO4:A$=MID$(T$,A,1):GOSUB450:IFT(A)=16THENGOSUB
380:GOTO430                                                       AK
·445 NEXT:B=(T(1)*4096)+(T(2)*256)+(T(3)*16)+T(4):RETURN          KB
·450 IFA$>"@"ANDA$<"G"THENT(A)=ASC(A$)-55:RETURN                  GM
·455 IFA$>"/"ANDA$<":"THENT(A)=ASC(A$)-48:RETURN                  NJ
·460 T(A)=16:RETURN                                               IC
·465 REM ADDRESS CHECK                                            OL
·470 IFAD>ENTHEN385                                               HO
·475 IFB<SRORB>ENTHEN390                                          LE
·480 IFB<2560R(B>40960ANDB<49152)ORB>53247THEN395                 OB
·485 RETURN                                                       HE
·490 REM ADDRESS TO HEX                                           PM
·495 AC=AD:A=4096:GOSUB520                                        AP
·500 A=256:GOSUB520                                               NF
·505 A=16:GOSUB520                                                LG
·510 A=1:GOSUB520                                                 HE
·515 RETURN                                                       JD
·520 T=INT(AC/A):IFT>9THENA$=CHR$(T+55):GOTO530                   OC
·525 A$=CHR$(T+48)                                                JI
·530 PRINTA$;:AC=AC-A*T:RETURN                                    AA
·535 A$="**SAVE**":GOSUB585                                       IC
·540 OPEN1,T,1,A$:SYS680:CLOSE1                                   AB
·545 IFST=0THENEND                                                FB
·550 GOSUB400:IFT=8THENGOSUB420                                   PM
·555 GOTO535                                                      FI
·560 A$="**LOAD**":GOSUB585                                       PE
·565 OPEN1,T,0,A$:SYS690:CLOSE1                                   PO
·570 IFST=64THEN195                                               OI
·575 GOSUB405:IFT=8THENGOSUB420                                   CO
·580 GOTO560                                                      GN
·585 PRINT" ":PRINTTAB(14)A$                                      KA
·590 PRINT:A$="":INPUT"FILENAME";A$                               IO
·595 IFA$=""THEN590                                               HK
·600 PRINT:PRINT"TAPE OR DISK?":PRINT                             HL
·605 GETB$:T=1:IFB$="D"THENT=8:A$="@0:"+A$:RETURN                 NP
·610 IFB$<>"T"THEN605                                             KO
·615 RETURN                                                       PH
·620 B$="CONTINUE FROM ADDRESS":GOSUB430:AD=B                     DD
·625 GOSUB475:IFB=0THEN620                                        NK
·630 PRINT:GOTO195                                                HN
·635 B$="BEGIN SCAN AT ADDRESS":GOSUB430:AD=B                     FK
·640 GOSUB475:IFB=0THEN635                                        LN
·645 PRINT:GOTO670                                                HI
·650 FORB=0TO7:AC=PEEK(AD+B):GOSUB505:IFAD+B=ENTHENAD=SR:G
OSUB410:GOTO195                                                   LM
·655 PRINT" ";:NEXTB                                              LE
·660 PRINT:AD=AD+8                                                CD
·665 GETB$:IFB$=CHR$(136)THEN195                                  JD
·670 GOSUB495:PRINT": ";:GOTO650                                  KE
```

IMPORTANT! Letters on white background are **Bug Repellent** line codes. **Do not enter them!** Pages 61 and 62 explain these codes and provide other essential information on entering ***Ahoy!*** programs. Refer to these pages **before** entering any programs!

ADRIFT IN A SEA OF FLOATING POINT NUMBERS

FROM PAGE 32

FLOATING POINT CONVERTER

```
·1 REM================================== NM
·2 REM                                   JD
·3 REM     FLOATING POINT CONVERTER      PB
·4 REM         RUPERT REPORT #60         OF
·5 REM                                   JC
·6 REM================================== CL
·10 PRINT"[CLEAR]FLOATING POINT CONVERTER
"                                        IN
·15 PRINT "[24"="]"                      IP
·20 X0=SQR(36)   :REM: X0 MUST BE FIRST V
ARIABLE                                  AI
·30 SP$="[39" "]"+CHR$(13)               OK
·40 DEF FNPTR(M)=PEEK(M)+256*PEEK(M+1)   BG
·60 FALSE=0: TRUE=NOT FALSE: C64=FALSE   GI
·70 IF FRE(0)=FRE(1) THEN C64=TRUE       EH
·80 VP=47: IF C64 THEN VP=45   :REM START
 VARIABLES POINTER                       AD
·90 SV=FNPTR(VP) :REM START VARIABLES    FA
·100 S1=SV+2: S2=SV+3: S3=SV+4: S4=SV+5:
S5=SV+6  :REM STORAGE AREA FOR X0        GP
·110 IF NOT C64 THEN BANK 1              DI
·200 REM ========= FP TO STORED VALUES == IF
·210 PRINT "(X TO SWITCH MODES; Q TO QUIT
)"                                       IJ
·220 PRINT "ENTER FLOATING PT. VALUE :"  AC
·225 INPUT X$: IF X$="" THEN 260         EE
·230 IF X$="Q" THEN END                  ED
·240 IF X$="X" THEN PRINT "[3"[UP]"]";SP$
;SP$;"[3"[UP]"]": GOTO 310               DN
·250 X0=VAL(X$)                          MF
·260 V1=PEEK(S1): V2=PEEK(S2): V3=PEEK(S3
): V4=PEEK(S4): V5=PEEK(S5)              MK
·270 GOSUB 1010                          FK
·280 GOTO 210                            DA
·300 REM ========= STORED VALUES TO FP == GG
·310 PRINT: PRINT "(X TO SWITCH MODES; Q
TO QUIT)"                                HE
·320 PRINT "ENTER 5 STORED VALUES  (0 TO
255) : "                                 PL
·330 INPUT "FIRST VALUE";X1$: V1=VAL(X1$) DO
·340 IF X1$="X" THEN PRINT "[3"[UP]"]";SP
$;SP$;SP$;"[4"[UP]"]": GOTO 210          AC
·350 IF X1$="Q" THEN END                 PF
·360 INPUT "2ND VALUE";X2$: V2=VAL(X2$)  NC
·370 INPUT "3RD VALUE";X3$: V3=VAL(X3$)  AM
·380 INPUT "4TH VALUE";X4$: V4=VAL(X4$)  PA
·390 INPUT "5TH VALUE";X5$: V5=VAL(X5$)  EG
·400 POKE S1,V1: POKE S2,V2: POKE S3,V3:
 POKE S4,V4: POKE S5,V5                  KJ
·410 GOSUB 1010                          OG
·420 GOTO 310                            MF
·1000 REM ===== CONVERSION & OUTPUT ===== AO
·1010 PRINT V1; V2; V3; V4; V5           EG
·1020 REM  -- EXPONENT, MANTISSA, SIGN -- KL
·1030 EX=V1-128                          EA
·1040 MN=(((V5/256+V4)/256+V3)/256 + (128
 OR V2))/256                             CC
·1050 SN=1: IF V2 >= 128 THEN SN=-1      II
·1060 PRINT "[RVSON]"; SN*MN; "[RVSOFF]*
2[UPARROW][RVSON]"; EX; "[RVSOFF] =  [RV
SON]"; X0; "[RVSOFF]": PRINT             KD
·1070 RETURN                             MA
```

TUBULAR

FROM PAGE 18

Starting address in hex: C000
Ending address in hex: CF3F
SYS to start: 49152

***Flankspeed* required for entry! See page 63.**

```
C000: 20 AB C5 A9 00 8D 0B DC B0
C008: 8D 0A DC 8D 09 DC 8D 08 85
C010: DC 20 CA C1 20 61 C4 20 FF
C018: 05 C6 20 F4 C1 20 C2 C0 5E
C020: 20 35 C3 20 9A C2 20 48 1F
C028: C2 20 17 C3 20 E8 C0 20 CF
C030: 78 C1 20 E1 FF D0 03 4C 8C
C038: 5F C0 AD F7 C9 C9 10 D0 72
C040: 19 EE E2 C9 AD E2 C9 C9 19
C048: 10 D0 03 4C 3A C1 20 00 94
C050: C1 20 48 C2 20 C2 C0 4C 2D
C058: 20 C0 AD E4 C9 F0 C1 A9 F1
C060: 81 8D 04 D4 A9 E0 8D F8 59
C068: 07 A0 1E A2 FF 8C 00 D4 32
C070: 20 E8 C0 E8 88 8C 01 D4 0E
C078: A9 00 9D 00 38 9D 1A 38 E7
C080: C0 00 D0 EC A9 80 8D 04 BA
C088: D4 AD FF 07 C9 E6 F0 1A CD
C090: 20 A9 C6 20 61 C4 20 48 CF
C098: C2 CE FF 07 A9 00 8D E4 4D
C0A0: C9 8D E3 C9 20 C2 C0 4C 95
C0A8: 20 C0 A2 00 BD 31 C9 9D 82
C0B0: AF 04 A9 06 9D AF D8 E8 23
C0B8: E0 09 D0 F0 20 C2 C0 4C 54
C0C0: 11 C0 A2 00 BD 26 C9 9D 80
C0C8: FE 04 A9 06 9D FE D8 E8 D9
C0D0: E0 0B D0 F0 AD 00 DC C9 D2
C0D8: 6F D0 F9 A2 00 A9 A0 9D 9D
C0E0: FE 04 E8 E0 0B D0 F8 60 E2
C0E8: EE F5 C9 AD F5 C9 D0 F8 CE
C0F0: EE F6 C9 AD F6 C9 C9 18 F0
C0F8: D0 EE A9 00 8D F6 C9 60 11
```

```
C100: AD AE C7 8D 6F C7 AD F1 88
C108: C7 8D B2 C7 AD 14 C8 8D EF
C110: F5 C7 18 AD AE C7 69 10 83
C118: 8D AE C7 18 AD F1 C7 69 05
C120: 0C 8D F1 C7 18 AD 14 C8 16
C128: 69 0E 8D 14 C8 20 A9 C6 9A
C130: 20 F4 C1 20 61 C4 20 AC 1A
C138: C1 60 A2 00 BD 56 C9 9D 78
C140: AF 04 A9 03 9D AF D8 E8 AF
C148: E0 09 D0 F0 A2 00 BD 5F B3
C150: C9 9D 26 07 E8 E0 1B D0 9A
C158: F5 A9 17 8D F7 C1 A9 16 16
C160: 8D 2B C2 20 F4 C1 AD 00 60
C168: DC C9 6F D0 F6 A9 41 8D BE
C170: F7 C1 8D 2B C2 4C 11 C0 C3
C178: AD 09 DC 29 0F C9 00 D0 DE
C180: 01 60 8D 7E C1 CE FA 07 80
C188: AD FA 07 C9 E4 F0 01 60 39
C190: A9 EE 8D FA 07 CE F9 07 88
C198: AD F9 07 C9 E4 F0 01 60 48
C1A0: A9 E5 8D F9 07 8D FA 07 4E
C1A8: EE E4 C9 60 AD FF 07 C9 25
C1B0: EE F0 03 EE FF 07 EE FE 77
C1B8: 07 AD FE 07 C9 EF F0 01 1F
C1C0: 60 A9 E5 8D FE 07 EE FD 31
C1C8: 07 60 A9 00 8D E2 C9 8D A1
C1D0: 6F C7 8D B2 C7 8D F5 C7 5B
C1D8: A9 10 8D AE C7 A9 0C 8D D9
C1E0: F1 C7 A9 0E 8D 14 C8 A0 5D
C1E8: E5 8C FD 07 C8 8C FE 07 BB
C1F0: 8C FF 07 60 A0 00 A9 41 70
C1F8: 8D 04 D4 8D 0B D4 AE F1 6D
C200: C9 BD 98 C9 AA BD 7A C9 96
C208: 8D 00 D4 BD 89 C9 8D 01 0A
C210: D4 AE F1 C9 BD A8 C9 AA 2A
C218: BD 7A C9 8D 07 D4 BD 89 CA
C220: C9 8D 08 D4 20 E8 C0 20 3E
C228: E8 C0 A9 41 8D 04 D4 8D B0
C230: 0B D4 EE F1 C9 C8 C0 10 54
C238: D0 BC A9 40 8D 04 D4 8D A3
C240: 0B D4 A9 00 8D F1 C9 60 73
C248: AD F8 C9 85 FB A9 60 85 C9
C250: FC AE F7 C9 E0 00 F0 10 9F
C258: A5 FB 18 69 80 85 FB A5 23
C260: FC 69 00 85 FC CA D0 F0 D5
C268: A9 76 85 02 A9 05 85 03 47
C270: A2 08 A0 0A B1 FB 91 02 07
C278: 88 10 F9 18 A5 02 69 28 5C
C280: 85 02 A5 03 69 00 85 03 A2
C288: 18 A5 FB 69 80 85 FB A5 53
C290: FC 69 00 85 FC CA 10 DA 2F
C298: 60 60 AD 00 DC C9 7F F0 1E
C2A0: F8 C9 7B D0 1F A2 00 AD 1F
C2A8: F7 C9 DD B8 C9 F0 06 E8 AA
C2B0: E0 0E D0 F3 60 AD F8 C9 35
C2B8: DD D4 C9 F0 DC CE F8 C9 94
C2C0: 20 E7 C2 60 C9 77 D0 1E 1C
C2C8: A2 00 AD F7 C9 DD B8 C9 3B
C2D0: F0 06 E8 E0 0E D0 F3 60 C4
C2D8: AD F8 C9 DD C6 C9 F0 B9 62
C2E0: EE F8 C9 20 FF C2 60 AD 83
C2E8: F8 07 C9 E2 D0 08 A9 E3 FB
C2F0: 8D F8 07 4C FB C2 A9 E2 16
C2F8: 8D F8 07 CE FA C9 60 AD 28
C300: F8 07 C9 E0 D0 08 A9 E1 0F
C308: 8D F8 07 4C 13 C3 A9 E0 43
C310: 8D F8 07 EE FA C9 60 AC 5E
C318: F2 C9 A2 00 B9 5C C8 9D F3
C320: 6B 31 C8 E8 E0 05 D0 F4 1A
C328: 8C F2 C9 C0 14 D0 05 A0 BC
C330: 00 8C F2 C9 60 A9 00 8D 11
C338: F3 C9 AD FA C9 8D 4A C3 04
C340: AD FB C9 8D 4B C3 AE F3 F2
C348: C9 AD 00 60 9D E5 C9 AD 1B
C350: 4A C3 9D E9 C9 AD 4B C3 6C
C358: 9D ED C9 18 AD 4A C3 69 EA
C360: 80 8D 4A C3 B0 03 4C 6C E8
C368: C3 EE 4B C3 EE F3 C9 AD 84
C370: F3 C9 C9 04 D0 D0 AD E5 31
C378: C9 C9 2A D0 04 20 BC C3 AB
C380: 60 AD E8 C9 C9 29 D0 04 09
C388: 20 F5 C3 60 AD E7 C9 C9 EB
C390: 2D D0 28 A9 17 8D 0B D4 E4
C398: A9 FF 8D 08 D4 AD EB C9 10
C3A0: 8D AC C3 AD EF C9 8D AD 41
C3A8: C3 A9 20 8D 00 60 20 37 7B
C3B0: C4 A0 FF 88 D0 FD A9 16 2D
C3B8: 8D 0B D4 60 A9 00 8D F3 B1
C3C0: C9 A9 81 8D 12 D4 A9 03 D6
C3C8: 8D 0F D4 A9 E4 8D F8 07 56
C3D0: 20 E8 C0 CE F7 C9 20 48 93
C3D8: C2 20 2E C4 EE F3 C9 AD 09
C3E0: F3 C9 C9 04 D0 EA CE F8 EF
C3E8: 07 CE FB C9 CE FB C9 A9 C2
C3F0: 80 8D 12 D4 60 A9 00 8D 7D
C3F8: F3 C9 A9 81 8D 12 D4 A9 FF
C400: 02 8D 0F D4 A9 E4 8D F8 88
C408: 07 20 E8 C0 EE F7 C9 20 A9
C410: 48 C2 20 2E C4 EE F3 C9 DA
C418: AD F3 C9 C9 04 D0 EA CE DB
C420: F8 07 EE FB C9 EE FB C9 89
C428: A9 80 8D 12 D4 60 A0 C8 90
C430: 8C 0E D4 88 D0 FA 60 EE 43
C438: E3 C9 AD E3 C9 C9 0E D0 E9
C440: 03 20 58 C4 EE FC 07 AD 21
C448: FC 07 C9 EF F0 01 60 A9 02
C450: E5 8D FC 07 EE FB 07 60 1A
C458: A9 2A 8D BF 6A 8D 3F 6B 1C
C460: 60 A2 00 8A 9D 00 38 9D 61
C468: 00 39 9D 00 3A 9D 00 3B 52
C470: E8 E0 00 D0 EF A2 00 A0 3E
C478: 00 BD 70 C8 99 00 38 BD FE
C480: 7F C8 99 00 39 C8 C8 C8 F5
C488: E8 E0 0F D0 EC A2 00 BD 7F
C490: 8E C8 9D 43 38 BD B7 C8 3F
C498: 9D 80 38 BD E0 C8 9D C3 B7
```

```
C4A0: 38 E8 E0 29 D0 E9 A9 00 30
C4A8: 8D F3 C9 A0 00 A2 00 BD F4
C4B0: 80 31 99 40 39 C8 C8 C8 CF
C4B8: E8 E0 08 D0 F2 18 AD B3 C7
C4C0: C4 69 40 8D B3 C4 B0 03 E8
C4C8: 4C CE C4 EE B4 C4 18 AD D6
C4D0: B0 C4 69 08 8D B0 C4 EE A9
C4D8: F3 C9 AD F3 C9 C9 0A D0 A6
C4E0: CA A9 31 8D B1 C4 A9 80 B4
C4E8: 8D B0 C4 A9 39 8D B4 C4 D5
C4F0: A9 40 8D B3 C4 A9 03 8D 1B
C4F8: AA 38 A9 C0 8D 01 38 A9 B6
C500: 80 8D 04 38 8D 07 38 A9 C0
C508: 40 8D 22 38 A9 03 8D AA 15
C510: 38 A9 73 8D FA C9 A9 83 E4
C518: 8D FB C9 A2 00 A9 00 9D 55
C520: E3 C9 E8 E0 15 D0 F8 A2 19
C528: 00 BD 7C C5 9D 00 D0 E8 7F
C530: E0 2F D0 F5 A9 64 A2 00 B7
C538: BD 63 C5 9D 00 D4 E8 E0 5B
C540: 19 D0 F5 A9 6E 8D F8 C9 88
C548: A9 44 8D F7 C9 A9 E2 8D 9F
C550: F8 07 A9 E5 8D FA 07 8D FC
C558: FB 07 8D FC 07 A9 EE 8D 13
C560: F9 07 60 00 00 00 08 00 C9
C568: 00 F8 00 00 00 08 00 0A 73
C570: 09 FF 40 00 00 80 69 69 0D
C578: 00 00 00 0F AE 93 4C DE F4
C580: 5C DE 8C DE 9C DE CC DE 4E
C588: DC DE 0C DE 80 1B 00 00 CA
C590: 00 FF D8 FE 1D 00 00 01 86
C598: 01 FE 00 00 0C 00 09 0E BB
C5A0: 01 0B 07 0A 01 01 01 01 C1
C5A8: 01 01 01 AD 0E DC 29 FE 6C
C5B0: 8D 0E DC A5 01 29 FB 85 7A
C5B8: 01 A2 00 BD 00 D0 9D 00 88
C5C0: 30 E8 E0 00 D0 F5 EE BD 2E
C5C8: C5 EE C0 C5 AD C0 C5 C9 02
C5D0: 37 D0 E6 A9 30 8D C0 C5 AD
C5D8: A9 D0 8D BD C5 A5 01 09 14
C5E0: 04 85 01 AD 0E DC 09 01 0E
C5E8: 8D 0E DC A2 00 BD 1C C8 A6
C5F0: 9D 18 31 E8 E0 40 D0 F5 A8
C5F8: A2 00 A9 00 9D 58 31 E8 55
C600: E0 18 D0 F6 60 A9 9A 20 85
C608: D2 FF A9 93 20 D2 FF A2 AD
C610: 00 A9 A0 9D 00 04 9D 00 99
C618: 05 9D 00 06 9D E8 06 E8 36
C620: E0 00 D0 ED A9 9B 20 D2 F7
C628: FF A2 09 A0 0E 18 20 F0 AB
C630: FF A9 20 20 D2 FF C8 C0 76
C638: 19 D0 F2 E8 E0 12 D0 EB AD
C640: A9 9F 20 D2 FF A9 12 20 58
C648: D2 FF A0 0D A2 08 18 20 AB
C650: F0 FF A9 20 20 D2 FF E8 E6
C658: E0 13 D0 F2 A0 19 A2 08 74
C660: 18 20 F0 FF A9 20 20 D2 46
C668: FF E8 E0 13 D0 F2 A2 00 AB
C670: A9 03 9D 4E D9 9D DE DA 3A
C678: E8 E0 0B D0 F3 A2 00 BD 72
C680: 09 C9 9D 25 07 A9 03 9D 67
C688: 25 DB 9D 00 D8 A9 A0 9D E7
C690: 00 04 E8 E0 1D D0 E8 A2 D7
C698: 00 BD 3A C9 9D 0C 04 A9 B1
C6A0: 03 9D 0C D8 E8 E0 1C D0 DC
C6A8: F0 A2 00 A9 23 9D 00 60 07
C6B0: E8 A9 24 9D 00 60 E8 E0 2F
C6B8: 00 D0 F0 EE B5 C6 EE AF 84
C6C0: C6 AD AF C6 C9 A0 D0 E1 C8
C6C8: A9 60 8D AF C6 8D B5 C6 E0
C6D0: A9 00 8D F3 C9 A9 BE 8D BB
C6D8: 19 C8 A9 69 8D 1A C8 A9 E7
C6E0: 02 8D F3 C6 A2 00 A9 25 9C
C6E8: 20 18 C8 E8 A9 20 20 18 D4
C6F0: C8 E8 E0 02 D0 F6 A9 26 1D
C6F8: 20 18 C8 18 AD 19 C8 69 0B
C700: 7F 8D 19 C8 B0 03 4C 0C FA
C708: C7 EE 1A C8 EE F3 C6 EE 3A
C710: F3 C6 EE F3 C9 AD F3 C9 E2
C718: C9 37 D0 C8 A9 00 8D F3 DD
C720: C9 A9 BC 8D 19 C8 A9 6A D3
C728: 8D 1A C8 A9 07 8D 3C C7 DA
C730: 8D 46 C7 A2 00 A9 27 20 5F
C738: 18 C8 E8 E0 01 F0 0A A9 88
C740: 28 20 18 C8 E8 E0 01 D0 05
C748: EC 38 AD 19 C8 E9 04 8D 78
C750: 19 C8 18 AD 3C C7 69 08 6D
C758: 8D 3C C7 8D 46 C7 EE 1A 8E
C760: C8 EE 1A C8 EE F3 C9 AD 55
C768: F3 C9 C9 0E D0 C5 A9 00 3E
C770: 8D F3 C9 AE F3 C9 BD 00 E5
C778: CA 8D 8A C7 BD 00 CB 8D 3A
C780: 8B C7 A9 00 8D F4 C9 A9 73
C788: 2A 8D 00 60 18 AD 8A C7 B8
C790: 69 80 8D 8A C7 B0 03 4C 5A
C798: 9D C7 EE 8B C7 EE F4 C9 ED
C7A0: AD F4 C9 C9 02 D0 E0 EE 79
C7A8: F3 C9 AD F3 C9 C9 10 D0 7C
C7B0: C2 A9 00 8D F3 C9 AE F3 0B
C7B8: C9 BD 00 CC 8D CD C7 BD ED
C7C0: C0 CC 8D CE C7 A9 00 8D A9
C7C8: F4 C9 A9 29 8D 00 60 18 60
C7D0: AD CD C7 69 80 8D CD C7 21
C7D8: B0 03 4C E0 C7 EE CE C7 07
C7E0: EE F4 C9 AD F4 C9 C9 02 C6
C7E8: D0 E0 EE F3 C9 AD F3 C9 B2
C7F0: C9 0C D0 C2 A9 00 8D F3 85
C7F8: C9 AE F3 C9 BD 80 CD 8D C8
C800: 0B C8 BD 60 CE 8D 0C C8 23
C808: A9 2D 8D 00 60 EE F3 C9 79
C810: AD F3 C9 C9 0E D0 E2 60 67
C818: 9D 00 60 60 55 7D 7D 55 1C
C820: D7 DF DF 57 5D DF DF 57 83
C828: D5 F7 F7 D7 7D FD F4 F4 2B
C830: D0 D0 40 40 7D 7F 1F 1F 8D
C838: 07 07 01 01 55 7F 55 FD 70
```

```
C840: 55 7F 55 00 55 FF 55 FF 15
C848: 55 FF 05 00 AA A2 A2 A2 35
C850: A2 80 A2 AA 55 51 40 51 F8
C858: 51 51 51 55 00 41 14 41 38
C860: 00 00 82 28 82 00 00 C3 51
C868: 3C C3 00 00 82 14 82 00 81
C870: 0F 3A 3A 0A 05 05 05 05 12
C878: 0D 05 05 01 15 31 03 06 DF
C880: 0F 0F 0F 05 05 15 15 15 F6
C888: 15 15 11 11 11 33 0F C0 E8
C890: 00 3A 80 00 3A 80 00 0A 10
C898: 00 00 05 00 00 05 00 00 A2
C8A0: 05 00 00 05 00 00 05 C0 70
C8A8: 00 05 00 00 05 00 00 10 C2
C8B0: 40 00 40 10 00 C0 30 0F 41
C8B8: C0 00 0A B0 00 0A B0 00 EE
C8C0: 02 80 00 01 40 00 01 40 C5
C8C8: 00 01 40 00 01 40 00 03 4E
C8D0: 40 00 01 40 00 01 40 00 93
C8D8: 05 00 00 01 50 00 01 30 60
C8E0: 0F C0 00 0A B0 00 0A B0 26
C8E8: 00 02 80 00 01 40 00 01 AD
C8F0: 40 00 01 40 00 01 40 00 B3
C8F8: 0D 40 00 01 40 00 01 40 C8
C900: 00 04 10 00 10 04 00 30 58
C908: 0C A0 83 8C 8F 83 8B A0 04
C910: A0 A0 82 85 8C 8C 93 A0 A6
C918: A0 A0 8C 85 96 85 8C A0 B4
C920: A0 A0 8D 85 8E A0 90 92 C6
C928: 85 93 93 A0 A0 86 89 92 B8
C930: 85 87 81 8D 85 A0 8F 96 98
C938: 85 92 94 A0 95 A0 82 A0 DE
C940: 95 A0 8C A0 81 A0 92 A0 F8
C948: A1 A0 A0 A0 A0 A0 A0 A0 4E
C950: A0 A0 A0 A0 A0 A0 A0 81 36
C958: 97 85 93 8F 8D 85 A0 A0 EC
C960: B1 B6 A0 8E 85 97 A0 8C 42
C968: 85 96 85 8C 93 A0 83 8F DD
C970: 8D 89 8E 87 A0 93 8F 8F F0
C978: 8E A0 00 0C E9 61 68 8F F6
C980: 30 8F 18 D2 C3 D1 1F 60 40
C988: 1E 00 07 07 08 09 0A 0B DA
C990: 0C 0E 0F 10 12 15 16 19 20
C998: 05 08 05 08 05 06 05 04 C6
C9A0: 06 05 04 03 02 04 02 01 BB
C9A8: 05 01 01 01 01 04 04 04 BD
C9B0: 04 01 01 01 01 05 05 01 C3
C9B8: 44 40 3C 38 34 30 2C 28 6A
C9C0: 24 20 1C 18 14 10 6E 6A 36
C9C8: 66 62 5E 5A 56 52 4E 4A 8B
C9D0: 46 42 3E 3A 06 0A 0E 12 02
C9D8: 16 1A 1E 22 26 2A 2E 32 F9
C9E0: 36 3A 00 00 00 00 00 00 51
C9E8: 00 00 00 00 00 00 00 00 E8
C9F0: 00 00 00 00 00 00 00 00 F0
C9F8: 00 00 73 83 00 00 00 00 EF
CA00: C0 B7 AD B9 A9 BF AF B7 B0
CA08: BD B7 C3 C1 C1 C1 C1 C1 0A
CA10: AA DA B5 C2 D0 AC BC D0 19
CA18: C7 BA C8 BC C0 C0 C0 C0 23
CA20: E1 E1 E1 D5 AB BB AF BF 72
CA28: BF C3 C0 BD C5 BB BB BB 23
CA30: D1 9D C5 CB BF BF B5 C9 30
CA38: B7 CF C9 BF C3 BB BB BB 40
CA40: BF BF D5 D5 D5 BF BF C9 8A
CA48: C9 BF BF C3 BD BD BD BD 4C
CA50: A3 A9 9B A0 BF BF B5 BF CE
CA58: B1 B9 BF BF BF BF BF BF 42
CA60: B7 B7 B7 B7 C1 BC C9 A9 31
CA68: C3 AF B4 BC B4 BF B9 BB 37
CA70: CF CD CB C9 A4 C7 A6 C1 78
CA78: C5 AA BE B9 B9 B9 B9 BB 4A
CA80: C1 C4 C8 CE D6 BF BF BF B4
CA88: C7 BF C7 B3 C7 BB BB BB 86
CA90: BF BF A9 C3 C7 C3 C3 BF 8C
CA98: C7 A9 B5 B5 B5 C8 C4 C1 7A
CAA0: BF BF BF BF BF BF BF BF 9E
CAA8: BF BF BF BF BF BF BF BF A6
CAB0: DB D9 D7 D5 D3 D4 BF BF 3C
CAB8: C0 B6 CC C4 C6 C8 BF BF D0
CAC0: AD D0 AA D2 A7 D4 C9 C6 C9
CAC8: C3 C0 BD B0 BC B3 B6 BB 9E
CAD0: C9 C9 AF CD AF B9 E1 AF DC
CAD8: DB CB AF BF BB BF BF BF EA
CAE0: B7 B7 CF CF C1 CF C1 AF F2
CAE8: C1 B0 C1 BD C1 C1 C1 C1 E1
CAF0: BD BB DA DA 9E AB AB D4 EA
CAF8: CE CE B8 B8 CE C3 C3 BB 1A
CB00: 82 80 7E 7C 7A 7A 78 76 E1
CB08: 74 72 70 6E 6C 6C 6C 6C 7F
CB10: 82 80 7E 7C 7A 78 76 76 ED
CB18: 74 72 70 6E 6C 6C 6C 6C 8F
CB20: 82 80 7E 7C 7A 7A 78 76 02
CB28: 74 72 70 6E 6E 6C 6C 6C A1
CB30: 82 80 80 7E 7C 7A 78 76 18
CB38: 74 74 72 70 6E 6C 6C 6C B7
CB40: 82 80 80 7E 7C 7A 78 76 28
CB48: 74 72 70 6E 6C 6C 6C 6C BF
CB50: 82 80 7E 7C 7C 7A 78 78 36
CB58: 76 74 72 70 6E 6C 6C 6C D9
CB60: 82 80 7E 7C 7C 7A 7A 78 48
CB68: 78 76 74 72 70 70 6E 6C F9
CB70: 82 80 7E 7C 7A 7A 78 78 54
CB78: 78 76 76 74 72 70 6E 6C 10
CB80: 82 80 7E 7C 7A 78 76 74 5C
CB88: 74 72 72 70 6E 6C 6C 6C 06
CB90: 82 80 7E 7E 7C 7A 7A 78 7A
CB98: 78 76 76 74 72 70 6E 6C 30
CBA0: 82 80 7E 7C 7A 78 76 74 7C
CBA8: 72 70 6E 6C 6C 6C 6C 6C 18
CBB0: 82 80 7E 7C 7A 78 76 74 8C
CBB8: 72 70 70 6E 6E 6E 6C 6C 30
CBC0: 82 82 80 80 7E 7E 7C 7A BA
CBC8: 78 76 74 72 72 70 6E 6C 5C
CBD0: 82 80 7E 7E 7C 7C 7C 7A C0
CBD8: 7A 78 76 74 72 70 6E 6C 74
```

```
CBE0: 82 80 80 7E 7C 7C 7A 78 CE
CBE8: 78 76 74 72 70 6E 6C 6C 76
CBF0: 82 80 80 7E 7C 7C 7A 7A E0
CBF8: 78 76 74 72 72 70 6E 6C 8C
CC00: D3 C1 A5 B1 C1 C6 C6 C6 03
CC08: C6 C6 C6 C6 9A E8 9F 9C E2
CC10: E2 DE C5 CB C3 C3 C3 C3 72
CC18: D1 A5 D1 A5 A5 B3 C4 C2 E7
CC20: C2 C2 C2 C2 AB D1 A5 C9 18
CC28: A9 AB B1 B1 B1 B1 B1 B1 A7
CC30: D7 CB D7 AB D7 AB B1 B7 44
CC38: CD BB C6 C6 B0 D5 B0 D5 5C
CC40: B0 D5 B0 D5 D5 C7 C7 C7 7A
CC48: BB BB BF BE BE BE BE BE 39
CC50: BE BE BE BE CC CA C8 C6 72
CC58: A7 C4 C3 B6 B6 B6 B6 C3 27
CC60: DE A5 DE A5 DE A5 DE A5 72
CC68: DE A5 A5 A5 B7 CA B9 CA 3F
CC70: AD CA B1 CA CA CA CA CA 90
CC78: A7 DA A5 AB D6 DC A5 AB 51
CC80: D6 DC A8 D9 BF BE CA BF BF
CC88: BE CA BF B8 B7 BD C5 C7 8D
CC90: C3 A0 DD A1 DC BA BA B5 7C
CC98: BA BA BA BA B4 B3 B5 B2 54
CCA0: B4 DA CA B0 CB CB CB CB DA
CCA8: E5 B5 B9 E5 E5 B1 CC D2 1B
CCB0: B1 B1 B1 B1 9C DC EB 98 75
CCB8: EB A0 A0 D1 DB DB C1 C1 F2
CCC0: 82 7C 7A 7A 7A 72 72 72 86
CCC8: 72 72 72 72 82 80 7E 7C 90
CCD0: 7C 7A 76 70 6C 6C 6C 6C 60
CCD8: 80 7E 7E 7C 7A 7A 74 6E AA
CCE0: 6E 6E 6E 6E 80 7E 7A 7A 8E
CCE8: 78 76 74 74 74 74 74 74 92
CCF0: 82 80 80 7E 7E 7C 7A 78 E0
CCF8: 74 70 70 6E 82 82 80 80 C2
CD00: 7E 7E 7C 7C 7A 76 74 72 CD
CD08: 7E 7C 7C 7A 78 76 74 72 CF
CD10: 72 72 72 72 82 80 7E 7C D7
CD18: 7A 7A 78 74 72 70 70 76 C3
CD20: 82 80 80 7E 7E 7C 7C 7A 14
CD28: 7A 78 78 78 7C 7C 7A 7A F9
CD30: 78 78 76 76 74 72 70 70 D5
CD38: 82 82 80 80 80 80 7E 7E 3C
CD40: 7E 7E 7C 7C 82 80 80 7E 38
CD48: 7C 7C 7A 76 74 70 6E 6E F3
CD50: 82 80 80 7E 7E 7A 78 76 3A
CD58: 76 74 72 72 80 7E 7E 7C 22
CD60: 7C 7C 7A 72 70 70 70 70 08
CD68: 82 80 80 80 7E 7C 7C 7C 60
CD70: 7A 78 78 78 82 82 82 80 5C
CD78: 80 7E 7C 7C 7A 78 74 72 4A
CD80: 47 5D 6B 39 2F 37 3E 2B 99
CD88: 2B 35 3B 39 42 40 22 50 52
CD90: 61 6A 2A 1E 4D 56 3C 40 C4
CD98: 4B 4A 42 41 48 54 5D 54 FF
CDA0: 5D 2D 47 2D 3A 41 41 41 9D
CDA8: 44 42 57 39 24 4E 5D 3B CA
CDB0: 41 2F 2A 34 4C 43 3D 42 8E
CDB8: 3E 40 56 54 56 2D 33 3E D6
CDC0: 40 48 4A 3E 40 45 3B 2F C1
CDC8: 1C 2F 2F 31 3E 40 37 33 5D
CDD0: 3E 33 3E 40 3B 4D 29 36 A8
CDD8: 39 3D 48 2A 3D 2A 35 3D 9B
CDE0: 35 3A 4B 4E 49 4C 47 4A 11
CDE8: 45 48 43 46 42 44 26 40 EC
CDF0: 45 5F 49 5F 24 4F 5F 1E 2F
CDF8: 57 5F 40 48 40 40 41 2B 25
CE00: 41 35 45 39 49 52 23 46 F9
CE08: 3D 33 52 40 28 59 28 59 0E
CE10: 28 59 40 3E 40 3E 40 3E 0D
CE18: 40 3E 40 58 40 40 54 40 44
CE20: 40 51 37 37 45 47 4B 46 3E
CE28: 29 54 26 55 24 57 4F 4C 38
CE30: 49 46 43 2F 34 43 35 47 26
CE38: 4B 33 35 34 45 1E 38 5C 18
CE40: 30 2D 52 40 36 38 37 4E 24
CE48: 50 4E 50 40 25 5A 29 40 60
CE50: 37 40 11 6A 2F 55 1E 55 3B
CE58: 27 5A 4B 50 2D 4F 34 3F 65
CE60: 84 84 84 82 80 7E 7E 7C 6A
CE68: 7A 78 76 72 70 6C 84 84 2A
CE70: 82 82 80 7E 7E 7C 7A 78 62
CE78: 76 72 70 6E 82 82 82 80 48
CE80: 80 7C 7C 7A 78 76 74 72 4A
CE88: 70 6C 84 82 80 80 80 7C 6A
CE90: 7C 7A 78 76 74 72 70 6C 3A
CE98: 82 82 80 7E 7E 7C 7A 7A 8C
CEA0: 7A 76 76 72 72 6E 84 82 62
CEA8: 80 80 7E 7E 7C 7C 7A 78 92
CEB0: 78 76 74 6E 84 82 80 80 8A
CEB8: 7C 7C 7C 78 78 76 74 72 7C
CEC0: 70 6E 82 82 80 80 7E 7E A2
CEC8: 7C 7C 7A 7A 78 78 7C 76 9A
CED0: 82 82 80 80 7E 7E 7E 7C CE
CED8: 7C 7C 78 74 6E 6C 82 80 9C
CEE0: 80 7E 7E 7C 7C 7C 7A 7A C8
CEE8: 78 74 74 6C 82 82 80 80 BC
CEF0: 7E 7E 7A 78 76 74 72 70 AE
CEF8: 6E 6C 82 82 80 7E 7E 7C D2
CF00: 7A 7A 76 72 70 70 70 6E 9D
CF08: 82 82 80 80 7E 7E 7C 7A 02
CF10: 78 76 74 72 70 6C 82 82 C7
CF18: 82 80 80 7E 7E 7C 7C 7C 0E
CF20: 78 74 74 72 82 82 80 7E F7
CF28: 7E 7C 7C 7A 78 78 76 76 F7
CF30: 6E 6C 84 80 7E 7E 7C 7C 06
CF38: 78 78 76 76 74 72 70 6C D9
```

PROBLEMS ENTERING A PROGRAM?

For assistance, call 212-239-6089 (if busy or no answer after three rings, call 212-239-0855).

IMPORTANT! Letters on white background are **Bug Repellent** line codes. **Do not enter them!** Pages 61 and 62 explain these codes and provide other essential information on entering ***Ahoy!*** programs. Refer to these pages **before** entering any programs!

SCREENSAVER64
FROM PAGE 55

BASIC LOADER

```
·100 REM *** SCREENSAVER 64 ***                    IH
·110 SS=51200:REM RELOCATING ***                   PI
·120 CK=0                                          OL
·130 READD:CK=CK+D:IFD=999THEN150                  AG
·140 GOTO130                                       KO
·150 IFCK<>20519THENPRINT"[3"*"] ERROR IN
  DATA [3"*"]":END                                 MB
·160 RESTORE:SA=SS                                 GB
·170 READD:IFD=999THEN220                          CA
·180 IFD=>0THENPOKESA,D:GOTO210                    MN
·190 AD=SS+ABS(D):H=AD/256:L=AD-INT(AD/25
6)*256                                             LJ
·200 POKESA,L:SA=SA+1:POKESA,H                     CA
·210 SA=SA+1:GOTO170                               OH
·220 PRINT"SCREENSAVER INSTALLED"SS"TO"SA          JK
·230 PRINT                                         IB
·240 PRINT"TO SAVE SCREEN: SYS"SS                  JL
·250 PRINT"RECALL SCREEN : SYS"SS+3                KK
·260 PRINT"CLEAR LINKS[3" "]: SYS"SS+6             AJ
·270 PRINT"MOVE STORAGE  : POKE"SS+9"[LEF
T], HIGH-BYTE"                                     CM
·280 END                                           JJ
·290 DATA 184,80,7,184,80,85,184,80                FF
·300 DATA 70,208,173,136,2,32,-160,173             GA
·310 DATA -9,133,196,132,195,32,-194,169           EN
·320 DATA 216,32,-160,32,-191,32,-245,160          AA
·330 DATA 24,185,217,0,32,-220,136,16              FI
·340 DATA 247,160,25,165,199,32,-220,200           EL
·350 DATA 173,134,2,32,-220,56,32,240              OO
·360 DATA 255,138,72,152,160,27,32,-220            BB
·370 DATA 104,200,76,-220,162,24,181,217           NF
·380 DATA 9,128,149,217,202,16,247,96              AI
·390 DATA 173,-9,32,-160,173,136,2,32              LB
·400 DATA -176,24,165,175,105,4,162,208            JB
·410 DATA 134,174,133,175,169,216,32,-176          OO
·420 DATA 160,24,32,-205,153,217,0,136             FH
·430 DATA 16,247,160,25,32,-205,133,199            KB
·440 DATA 200,32,-205,141,134,2,200,32             NA
·450 DATA -205,72,200,32,-205,170,104,168          AN
·460 DATA 24,76,240,255,160,0,133,173              LN
·470 DATA 132,172,24,105,3,133,175,169             ON
·480 DATA 232,133,174,96,132,195,133,196           LM
·490 DATA 32,-205,145,195,32,-237,208,246          BB
·500 DATA 96,32,-245,177,172,32,-220,32            KO
·510 DATA -237,208,246,96,162,52,8,120             EJ
·520 DATA 165,1,134,1,170,177,172,134              HL
·530 DATA 1,40,96,162,52,8,120,72                  NE
·540 DATA 165,1,134,1,170,104,145,195              JK
·550 DATA 134,1,40,96,32,219,252,32                BM
·560 DATA 209,252,240,6,230,195,208,2              PC
·570 DATA 230,196,96,999                           LB
```

DEMO

```
·100 SS=51200                                      LB
·110 POKESS+9,53248/256:REM START OF STOR
 AGE                                               EM
·120 P$="[RVSON]PRESS A KEY[RVSOFF]"               HP
·130 SYS65409:REM DEFAULT SCREEN SET UP            CP
·140 D=5:R=0:GOSUB590                              HB
·150 PRINT"WHEN PRINTING MESSAGE BOXES AN
 D PSEUDO  WINDOWS ON THE C-64 SCREEN,";           IA
·160 PRINT" THINGS DON'TALWAYS WORK OUT A
 S PLANNED.":TT=2:GOSUB620                         AB
·170 PRINT:PRINT"LINES THAT WRAP CAN DISR
 UPT YOUR NICE,  NEAT BOX[3"."]":GOSUB620          KF
·180 PRINT"[DOWN]"TAB(10)P$                        DF
·190 GOSUB640                                      OM
·200 SYS SS:REM SAVE SCREEN                        LD
·210 C=1:GOSUB430                                  EN
·220 GOSUB640                                      AG
·230 SYS SS+3:REM RECALL SCRN                      JP
·240 GOSUB620                                      BE
·250 PRINT"[UP]BUT, IF YOU SET BIT 7 OF L
 OCATIONS 217  THRU 242,";:GOSUB620                DO
·260 PRINT" WRAPPED LINES ARE UN-LINKED[3
 " "]AND THE BOX COMES OUT AS PLANNED.             DP
·270 GOSUB620:PRINT"[DOWN]"TAB(R)P$:GOSUB
 640                                               II
·280 SYS SS:SYS SS+6:C=3:GOSUB430                  JH
·290 GOSUB640:SYS SS+3                             JJ
·300 GOSUB620                                      FD
·310 PRINT"[UP][GREEN]NOW EXECUTING MULTI
 PLE SCREEN SAVES[3"."]"                           FG
·320 GOSUB620                                      GP
·330 W=16:H=4:D=3:R=5                              OM
·340 FORC=1TO4:SYS SS                              GK
·350 POKESS+9,PEEK(SS+9)+8:REM MOVE STORA
 GE                                                HD
·360 POKE646,C:D=D+2:R=R+2:GOSUB480                BD
·370 NEXT                                          PF
·380 GOSUB620:GOSUB590:PRINT"[DOWN][DOWN]
 [RIGHT][RIGHT]"P$;:GOSUB640                       HE
·390 FORC=1TO4:POKESS+9,PEEK(SS+9)-8               AL
·400 SYSSS+3                                       KC
·410 TT=.5:GOSUB620:NEXT                           HC
·420 END                                           CF
·430 POKE646,C:W=22:H=8:D=4:R=6:RV$="[RVS
 ON]":GOSUB490                                     GH
·440 D=8:R=12:GOSUB590:PRINTRV$"LIKE THIS
 "                                                 FL
·450 GOSUB620:PRINT"[YELLOW][3"[DOWN]"]"T
 AB(R-1)P$;                                        GO
·460 RETURN                                        FL
```

IMPORTANT! Letters on white background are **Bug Repellent** line codes. **Do not enter them!** Pages 61 and 62 explain these codes and provide other essential information on entering ***Ahoy!*** programs. Refer to these pages **before** entering any programs!

```
·470 REM *** PRINT BOX ***                                    KP
·480 SYS SS+6:REM CLEAR LINKS                                 MG
·490 GOSUB590                                                 BF
·500 PRINTRV$"[c A]";                                         II
·510 FORI=1TOW-2:PRINT"[s *]";:NEXT:PRINT
 "[c S]"                                                      BL
·520 FORI=1TOH:PRINTTAB(R);                                   MK
·530 PRINTRV$"[s -]";:FORJ=1TOW-2:PRINT"
 ";:NEXT:PRINT"[s -]":NEXT                                    EK
·540 PRINTTAB(R)RV$;                                          NP
·550 PRINT"[c Z]";:FORI=1TOW-2:PRINT"[s *
 ]";:NEXT                                                     AC
·560 PRINT"[c X]"                                             NF
·570 RETURN                                                   MK
·580 REM                                                      NH
·590 POKE214,D-1:PRINT:REM VERTICAL POSIT
 ION                                                          CA
·600 PRINTTAB(R);:REM HORIZ POS.                              OI
·610 RETURN                                                   PC
·620 REM TIME DELAY                                           JD
·630 FORT=1TO1000*TT:NEXT:RETURN                              FC
·640 REM WAIT FOR KEY PRESS                                   LG
·650 POKE198,0:WAIT198,1:RETURN                               ML
```

TRI WORDS
FROM PAGE 18

MAIN PROGRAM

```
·10 REM ************************                          LN
·20 REM *  TRI WORDS            *                          IE
·30 REM *  BOB BLACKMER         *                          BD
·40 REM *  6118 S. BRIAR BAYOU  *                          BN
·50 REM *  HOUSTON,TX 77072     *                          EG
·60 REM ************************                          NH
·70 RN=RND(-TI)                                            NI
·80 IFPEEK(4864)<>1THENBLOAD "WORDLIST"                     JK
·90 PRINT"[CLEAR] SETTING UP[3"."]1 MINUT
 E":POKE54,56:POKE58,56:CLR:DIMNU(15),PO(
 16),K(16),W$(400)                                          NL
·100 DEF FNA(X)=NU((CCAND240)/16):DEF FNB
 (X)=NU(CCAND15):DEF FNC(X)=PEEK(AA+NL+IL
 ):DEF FND(X)=BB+2*(NL+IL)+1                                JJ
·110 COLOR0,1:COLOR4,12:GOSUB740:GOSUB610                   NH
·120 X1=3:Y1=2:X2=30:Y2=2:SUM=0:QU=0:W=0:
 S1=0:S2=0:C1$="[CYAN]":C2$="[CYAN]":POKE
 3692,0:POKE3693,19                                         AD
·130 REM ***** MAIN LOOP *****                              OD
·140 GOSUB210:IFQUTHENGOSUB320:IFWTHENF$=
 "I'M STUMPED":GOSUB470:F$=" WE  TIED ":G
 OSUB480:GOTO190:ELSEIFQUTHEN180                            MK
·150 GOSUB320:IFWTHEN170                                    BA
·160 GOTO140                                                LJ
·170 F$="[WHITE]I'M STUMPED":GOSUB470:F$=
 "[CYAN]!YOU  WIN!":GOSUB480:GOTO190                        BK
·180 F$="[WHITE]! I  WIN !":GOSUB470:F$="
 [YELLOW]NICE  GAME":GOSUB480                               BD
·190 CHAR1,14,24,"[c 1]PRESS ANY KEY":POK
 E208,0:WAIT208,1:RESTORE1070:GOSUB610:GO
 TO120                                                      PO
·200 REM ***** YOUR TURN *****                              IG
·210 F$="[WHITE]YOUR  TURN":GOSUB470:CHAR
 1,18,22:Q=3:GOSUB510:F$="[10" "]":GOSUB4
 70:GOSUB480:IFN$="[3"@"]"THENQU=1:RETURN                   CC
·220 FORL=1TO3:POKE249+L,ASC(MID$(N$,L,1)
 )-64:NEXT:SYS3584:IFPEEK(253)THENF$="[PU
 RPLE]NO DOUBLES":GOSUB490:GOTO210                          AG
·230 B=0:FORV=1TO3:FORS=1TO16:IFASC(MID$(
 N$,V,1))-64<>K(S)THEN240:ELSEB=B+1                         HN
·240 NEXTS,V                                                EO
·250 IFB<>3THENF$="[c 3][UPARROW][UPARROW
 ] LOOK [UPARROW][UPARROW]":GOSUB490:GOTO
 210                                                        FL
·260 SYS3615:IFPEEK(253)THENF$="[c 6]NOT
 A WORD":GOSUB490:GOTO210                                   JH
·270 GOSUB430:IFWOTHENF$="[YELLOW]WORD  U
 SED":GOSUB490:GOTO210                                      CN
·280 CHAR1,X1,Y1,C1$+N$:SUM=SUM+1:W$(SUM)
 =N$:Y1=Y1+1:IFY1=22ANDX1=3THENY1=2:X1=7:
 ELSEIFY1=22THENY1=2:X1=3                                   HB
·290 S1=S1+1:IF(S1=40ORS1=120)THENC1$="[Y
 ELLOW]":ELSEIF(S1=80ORS1=160)THENC1$="[C
 YAN]"                                                      AL
·300 CHAR1,0,23:PRINTTAB(7)"[WHITE]:";S1:
 PLAY "V104T8HFV204T2IADEFV1QFV2QD":RETUR
 N                                                          EK
·310 REM ***** 128'S TURN *****                             PJ
·320 F$="[WHITE] MY  TURN ":GOSUB470                        JH
·330 CHAR1,15,22,"[CYAN]THINKING.."                         DJ
·340 SYS3694:IFPEEK(254)THENW=1:RETURN                      OE
·350 B=0:FORV=250TO252:FORS=1TO16:IFPEEK(
 V)<>K(S)THEN360:ELSEB=B+1                                  NP
·360 NEXTS,V:IFB<>3THEN340                                  JE
·370 N$="":FORL=1TO3:N$=N$+CHR$(PEEK(L+24
 9)+64):NEXT:GOSUB430:IFWOTHEN340                           FE
·380 F$="[10" "]":GOSUB470:GOSUB480                         CG
·390 CHAR1,X2,Y2,C2$+N$:SUM=SUM+1:W$(SUM)
 =N$:Y2=Y2+1:IFY2=22ANDX2=30THENY2=2:X2=3
 4:ELSEIFY2=22THENY2=2:X2=30                                NH
·400 S2=S2+1:IF(S2=40ORS2=120)THENC2$="[Y
 ELLOW]":ELSEIF(S2=80ORS2=160)THENC2$="[C
 YAN]"                                                      ID
·410 CHAR1,0,23:PRINTTAB(34)"[WHITE]:";S2
 :PLAY "V102T8QAV203T2QCV1QCV2QDV1QAV2QF"
 :RETURN                                                    AJ
·420 REM ***** WORD USED *****                              AI
·430 WO=0:FORL=1TOSUM:IFW$(L)=N$THENWO=1                    BK
·440 NEXTL:RETURN                                           FA
·450 REM ***** PRINT ROUTINES *****                         ON
·460 POKELOC,LR:POKELOC+40,LR+1:POKELOC+1
 ,LR+2:POKELOC+41,LR+3:RETURN                               OI
·470 CHAR1,15,20,F$:RETURN                                  FG
```

```
·480 CHAR1,15,22,F$:RETURN                                    KC
·490 CHAR1,15,20,F$:GOSUB590:SLEEP2:RETUR
N                                                             PE
·500 REM ***** INPUT ROUTINE *****                           MF
·510 N$="":ZL=LEN(N$):POKE208,0:PRINTCHR$
(43)CHR$(157);                                                KP
·520 GETZ$:Z=ASC(Z$):IF(Z=13ORZ=20)THEN53
0:ELSEIF(Z<64ORZ>90)THEN520                                   BF
·530 ZL=LEN(N$):IFZL=QTHEN550                                 ML
·540 IFZ>20THENN$=N$+Z$:PRINTZ$CHR$(43)CH
R$(157);:GOTO520                                              BG
·550 IFZ=13ANDZL=QTHENRETURN                                  NP
·560 IFZ=20ANDZLTHENN$=LEFT$(N$,ZL-1):PRI
NTCHR$(32)CHR$(157)CHR$(157)CHR$(43)CHR$
(157);                                                        EN
·570 GOTO520                                                  FL
·580 REM ***** BUZZER *****                                   DF
·590 SOUND3,1200,20,0,0,0,1:RETURN                            EM
·600 REM ***** DRAW SCREEN *****                              HP
·610 PRINT"[CYAN][CLEAR][5"[DOWN]"]"TAB(9
)"[YELLOW]N[RED]ORMAL OR [YELLOW]S[RED]U
PER BRAIN"                                                    OB
·620 GETLV$:IFLV$<>"N"ANDLV$<>"S"THEN620                      PE
·630 IFLV$="N"THENPOKE3737,24:ELSEPOKE373
7,25                                                          BN
·640 PRINT"[RED][CLEAR]":READLOC:FORL=1TO
3:READLR:GOSUB460:LOC=LOC+2:NEXT:READLOC
:FORL=1TO5:READLR:GOSUB460:LOC=LOC+2:NEX
T                                                             LH
·650 A$=CHR$(40):B$=CHR$(41):TP$="[BLUE]$
[7"*"]%":BT$="[BLUE]&[7"*"]'":BX$="[c 2]
$**%[DOWN][4"[LEFT]"]([YELLOW]  [c 2])[D
OWN][4"[LEFT]"]([YELLOW]  [c 2])[DOWN][4
"[LEFT]"]&**'":SC$="[GREEN]WORDS[WHITE]:
[3" "]"                                                       PH
·660 PRINTTAB(2)TP$TAB(29)TP$:FORL=2TO21:
CHAR1,2,L,A$:CHAR1,10,L,B$:CHAR1,29,L,A$
:CHAR1,37,L,B$:NEXT:PRINT:PRINTTAB(2)BT$
TAB(29)BT$                                                    II
·670 FORA=12TO24STEP4:FORB=3TO15STEP4:CHA
R1,A,B,BX$:NEXT:NEXT:CHAR1,0,23:PRINTTAB
(2)SC$TAB(29)SC$                                              DN
·680 REM ***** PICK 16 LETTERS *****                         LP
·690 FORL=1TO16                                               GO
·700 RN=INT(RND(1)*26)+1                                      EN
·710 FORE=1TOL:IFK(E)=RNTHEN700:ELSEIFK(E
)<>RNTHENNEXTE                                                PO
·720 K(L)=RN:IFK(L)=0THEN700:ELSENEXTL:FO
RL=1TO16:LOC=PO(L):LR=(K(L)*4)+64:GOSUB4
60:NEXT:RETURN                                                KN
·730 REM ***** INITIALIZE *****                              NH
·740 BANK14:FORI=0TO2047:POKEI+14336,PEEK
(I+53248):NEXT:BANK15                                         HJ
·750 FORL=1TO15:READNU(L):NEXT                                GI
·760 FOROL=8TO208STEP8:AA=14336+OL:BB=148
48+4*OL:FORIL=0TO4STEP4:FORNL=0TO3:CC=FN
C(0):DD=FND(0):XX=FNA(0):YY=FNB(0)                            JP
·770 POKEDD,XX:POKEDD+1,XX:POKEDD+16,YY:P
OKEDD+17,YY:NEXT NL,IL,OL                                     AP
·780 FORL=14624TO14687:READA:POKEL,A:NEXT
:FORL=1TO16:READPO(L):NEXT                                    ED
·790 CK=0:FORL=3584TO3742:READA:CK=CK+A:P
OKEL,A:NEXT:IFCK<>19489THENPRINT"ERROR I
N LINES 870-1060"                                             JE
·800 POKE2604,(PEEK(2604)AND240)+14:RETUR
N                                                             OL
·810 REM ***** CHAR AND LOC DATA *****                       DL
·820 DATA 3,12,15,48,51,60,63,192,195,204
,207,240,243,252,255                                          KO
·830 DATA 0,0,0,31,31,28,28,28,0,0,0,248,
248,56,56,56,28,28,28,31,31,0,0,0,56,56,
56,248,248,0,0,0                                              EJ
·840 DATA 28,28,28,28,28,28,28,28,56,56,5
6,56,56,56,56,56,0,0,0,255,255,0,0,0,0,0
,0,0,0,0,0,255                                                CM
·850 DATA 1197,1201,1205,1209,1357,1361,1
365,1369,1517,1521,1525,1529,1677,1681,1
685,1689                                                      EM
·860 REM ***** ML ROUTINE DATA *****                         FE
·870 DATA 169,0,133,253,165,250,197,251                       BJ
·880 DATA 240,15,197,252,240,11,165,251                       CA
·890 DATA 197,252,240,5,169,0,133,253                         AL
·900 DATA 96,230,253,96,0,0,19,169                            FD
·910 DATA 0,141,29,14,169,19,141,30                           JL
·920 DATA 14,173,30,14,141,57,14,160                          MN
·930 DATA 0,140,28,14,174,29,14,189                           PO
·940 DATA 0,19,217,250,0,208,3,238                            IL
·950 DATA 28,14,232,200,192,3,208,239                         GA
·960 DATA 142,29,14,173,28,14,201,3                           IJ
·970 DATA 240,21,224,255,208,211,232,142                      OG
·980 DATA 29,14,238,30,14,173,30,14                           PK
·990 DATA 201,25,208,197,230,253,96,169                       JF
·1000 DATA 0,133,253,96,0,19,173,109                          NJ
·1010 DATA 14,141,125,14,160,0,132,254                        CP
·1020 DATA 174,108,14,189,0,19,153,250                        BP
·1030 DATA 0,232,200,192,3,208,244,142                        OP
·1040 DATA 108,14,224,255,208,16,232,142                      DA
·1050 DATA 108,14,238,109,14,173,109,14                       AP
·1060 DATA 201,25,208,2,230,254,96                            GJ
·1070 DATA 1035,144,136,100,1043,156,124,
136,80,140                                                    LI
```

TRI.DATA

```
·10 CK=0:FORL=4864TO6399:READA:CK=CK+A:PO
KEL,A:NEXT:IFCK<>17381THENPRINT"ERROR IN
 DATA":STOP                                                   GN
·20 PRINT"[CLEAR][5"[DOWN]"] READY TO WRI
TE WORD FILE":PRINT" PRESS ANY KEY WHEN
READY"                                                        KF
·30 POKE208,0:WAIT208,1:BSAVE"WORDLIST",B
0,P4864 TO P6400                                              EG
·40 DATA 1,3,5,1,3,20,4,21                                    KH
·50 DATA 2,4,21,5,4,21,7,7                                    PE
·60 DATA 1,19,7,1,25,7,5,13                                   NI
·70 DATA 2,15,23,2,15,24,6,15                                 OI
```

```
·80 DATA 7,6,15,5,2,21,14,12                OB
·90 DATA 5,20,12,5,7,12,1,23                LB
·100 DATA 13,15,16,13,21,4,13,15            JO
·110 DATA 23,20,15,5,20,9,16,16             OM
·120 DATA 1,4,16,1,14,19,11,25              KI
·130 DATA 19,11,9,19,5,23,19,5              PN
·140 DATA 20,13,1,25,13,5,14,22             BP
·150 DATA 1,14,22,1,20,18,9,2               MF
·160 DATA 23,15,14,2,21,4,2,21              HP
·170 DATA 7,1,14,25,1,16,5,3                MI
·180 DATA 1,14,2,1,20,7,9,14                IA
·190 DATA 7,5,20,9,14,11,1,18               HI
·200 DATA 20,6,21,14,8,1,25,8               FG
·210 DATA 5,25,12,9,16,12,9,20              FE
·220 DATA 8,15,20,8,15,7,8,15               OD
·230 DATA 16,5,14,4,3,15,23,3               EK
·240 DATA 21,16,10,1,13,13,1,14             HB
·250 DATA 14,5,23,20,1,14,18,21             II
·260 DATA 14,16,21,20,14,1,16,14            FM
·270 DATA 15,23,20,1,18,23,8,25             DF
·280 DATA 23,8,15,20,15,25,20,18            IC
·290 DATA 25,19,9,20,18,1,14,13             DD
·300 DATA 9,24,19,9,16,23,1,18              PE
·310 DATA 1,7,5,1,18,5,4,9                  OP
·320 DATA 13,4,9,7,7,21,14,8                MG
·330 DATA 9,20,8,9,13,8,9,19                EE
·340 DATA 12,9,4,12,15,7,1,20               BE
·350 DATA 5,4,15,20,4,18,25,0               MO
·360 DATA 25,5,19,15,12,4,15,9              FC
·370 DATA 12,15,1,11,20,5,1,19              IC
·380 DATA 21,14,15,14,5,21,19,5             EC
·390 DATA 18,5,4,14,15,20,19,8              MD
·400 DATA 5,23,9,14,18,9,16,18              CI
·410 DATA 15,2,20,15,16,20,1,7              FF
·420 DATA 20,8,5,15,21,18,15,21             BO
·430 DATA 20,18,21,2,16,9,14,1              BI
·440 DATA 14,4,1,14,20,2,9,7                KG
·450 DATA 2,9,14,8,15,23,11,9               BH
·460 DATA 20,10,21,7,10,15,25,8             IN
·470 DATA 9,16,4,5,14,4,1,25                JL
·480 DATA 8,1,13,8,1,4,7,15                 KL
·490 DATA 20,10,1,23,9,3,5,12               EE
·500 DATA 1,16,12,5,4,8,21,7                CP
·510 DATA 2,21,20,2,21,19,3,1               GH
·520 DATA 20,3,1,18,4,15,7,8                NK
·530 DATA 5,14,6,12,25,13,1,20              PG
·540 DATA 16,15,20,18,1,25,19,15            IC
·550 DATA 14,20,15,14,20,9,5,19             DP
·560 DATA 9,14,25,15,21,23,1,24             DF
·570 DATA 18,1,7,14,21,20,18,21             PI
·580 DATA 7,19,21,13,1,19,11,1              OJ
·590 DATA 18,13,6,1,14,10,5,20              FI
·600 DATA 6,9,14,6,15,18,10,15              LP
·610 DATA 2,12,1,25,12,15,23,2              BA
·620 DATA 9,4,2,5,4,1,9,18                  OC
·630 DATA 8,1,19,12,9,5,8,9                 GC
·640 DATA 4,4,9,5,11,9,4,3                  NH
·650 DATA 21,20,13,1,16,20,9,14             JA
·660 DATA 20,5,14,19,9,24,15,1              PJ
·670 DATA 20,14,5,20,16,9,7,0               JH
·680 DATA 18,21,20,20,1,2,18,9              BG
·690 DATA 7,16,5,14,16,5,1,14               HG
·700 DATA 9,16,12,1,4,6,9,24                HJ
·710 DATA 7,21,13,2,21,13,2,1               IK
·720 DATA 4,12,15,20,3,18,25,1              GO
·730 DATA 9,4,6,1,18,10,1,18                AM
·740 DATA 11,5,25,16,1,20,3,21              IF
·750 DATA 2,8,1,20,6,9,20,3                 OM
·760 DATA 1,16,2,1,25,6,18,25               GE
·770 DATA 13,1,4,18,1,20,19,1               BH
·780 DATA 20,16,5,20,23,5,2,25              DN
·790 DATA 5,20,16,9,20,19,1,4               FP
·800 DATA 23,9,7,15,23,12,14,15             GA
·810 DATA 4,18,15,20,20,21,2,23             FP
·820 DATA 1,7,16,1,25,2,15,25               IF
·830 DATA 6,15,24,3,15,20,3,1               FI
·840 DATA 2,5,1,18,6,1,20,10                EA
·850 DATA 1,2,3,15,2,18,21,13               MJ
·860 DATA 13,15,2,18,9,13,18,15             LB
·870 DATA 23,23,9,20,14,1,7,20              PE
·880 DATA 15,23,23,5,4,19,1,25              HJ
·890 DATA 16,21,14,18,1,23,19,1             GB
·900 DATA 16,16,9,5,1,9,13,19               DN
·910 DATA 9,18,20,1,24,4,9,16               IA
·920 DATA 2,9,20,2,1,18,7,1                 IN
·930 DATA 16,8,21,20,6,1,4,2                FE
·940 DATA 1,7,2,5,7,5,12,13                 FI
·950 DATA 8,15,5,1,19,8,4,15                IB
·960 DATA 5,8,21,2,10,9,7,12                HN
·970 DATA 21,7,4,1,2,2,5,20                 KM
·980 DATA 16,15,4,13,21,7,14,1              LP
·990 DATA 2,15,1,18,19,1,7,0                LP
·1000 DATA 20,21,7,20,1,16,19,5             NF
·1010 DATA 1,19,1,23,16,1,23,15             KI
·1020 DATA 18,5,23,5,20,19,12,25            BI
·1030 DATA 19,16,25,3,21,5,2,1              GC
·1040 DATA 14,3,15,14,11,5,7,10             NH
·1050 DATA 1,7,6,21,18,7,1,2                AN
·1060 DATA 10,15,7,3,15,4,1,9               LP
·1070 DATA 12,4,1,13,4,5,23,7               PL
·1080 DATA 21,20,7,15,4,12,1,7              HB
·1090 DATA 6,9,7,2,21,25,2,25               PH
·1100 DATA 5,10,15,20,5,1,20,6              DC
·1110 DATA 9,2,5,12,11,15,23,5              ML
·1120 DATA 19,15,2,18,15,4,18,1             JI
·1130 DATA 16,19,8,25,16,1,18,19            BM
·1140 DATA 15,4,16,18,25,15,1,6             OH
·1150 DATA 10,1,25,8,21,5,8,1               KG
·1160 DATA 7,11,9,14,3,1,13,5               IC
·1170 DATA 12,6,23,1,25,9,3,25              FP
·1180 DATA 9,22,25,8,5,13,1,18              CJ
·1190 DATA 11,6,9,18,1,23,5,7               OI
·1200 DATA 21,25,6,5,23,23,1,4              LO
·1210 DATA 12,1,24,13,1,18,16,18            HL
·1220 DATA 15,19,16,1,19,15,25,25           PK
·1230 DATA 1,16,15,4,5,18,1,13              MN
```

IMPORTANT! Letters on white background are **Bug Repellent** line codes. **Do not enter them!** Pages 61 and 62 explain these codes and provide other essential information on entering ***Ahoy!*** programs. Refer to these pages **before** entering any programs!

```
·1240 DATA 22,5,20,22,15,23,19,21          EJ
·1250 DATA 5,16,5,7,13,5,20,20             EF
·1260 DATA 23,15,20,1,4,19,20,25           LM
·1270 DATA 9,13,16,18,25,5,19,21           HN
·1280 DATA 2,18,9,4,2,15,7,16              LL
·1290 DATA 21,2,16,15,24,16,5,23           KB
·1300 DATA 10,21,20,12,25,5,1,24           EE
·1310 DATA 5,1,12,5,3,15,7,0               PI
·1320 DATA 5,18,1,12,15,2,8,5              LO
·1330 DATA 24,9,18,5,4,9,14,1              BH
·1340 DATA 7,15,3,1,4,3,15,25              FC
·1350 DATA 3,21,4,4,25,5,7,15              NK
·1360 DATA 2,9,18,11,22,5,24,25            DO
·1370 DATA 1,13,26,9,16,20,15,7            DC
·1380 DATA 20,1,13,14,1,25,14,15           FF
·1390 DATA 18,19,15,24,16,12,25,16         NO
·1400 DATA 5,18,15,23,14,16,21,7           ED
·1410 DATA 23,15,5,8,21,13,12,1            DB
·1420 DATA 13,12,15,24,5,15,14,5           OG
·1430 DATA 7,15,4,15,14,1,23,12            OP
·1440 DATA 7,1,4,1,6,20,1,19               LE
·1450 DATA 16,6,12,21,7,5,12,12            JD
·1460 DATA 15,16,14,21,2,18,21,5           LM
·1470 DATA 19,5,24,19,15,16,20,8           OI
·1480 DATA 25,25,1,11,13,9,4,16            DD
·1490 DATA 21,19,14,9,12,19,21,16          FF
·1500 DATA 23,18,25,15,18,2,18,1           FG
·1510 DATA 8,20,15,13,25,5,1,21            BM
·1520 DATA 18,14,1,4,15,1,25,5             NL
·1530 DATA 4,21,15,3,21,18,9,15            IN
·1540 DATA 14,6,18,15,2,15,1,22            PE
·1550 DATA 9,5,7,14,21,19,15,23            KH
·1560 DATA 13,15,4,15,16,20,15,8           NM
·1570 DATA 13,18,15,5,1,16,20,1            KO
·1580 DATA 18,3,2,1,8,4,21,14              CL
·1590 DATA 8,5,18,10,9,2,21,7              GO
·1600 DATA 8,20,21,24,19,15,20,16          JC
·1610 DATA 1,12,23,1,19,14,9,20            MJ
·1620 DATA 8,9,5,9,12,11,21,13             DL
·1630 DATA 16,6,5,4,22,9,13,0              DH
·1640 DATA 1,12,16,1,21,11,2,15            CE
·1650 DATA 16,2,21,18,3,1,23,3             JN
·1660 DATA 1,25,3,15,19,3,15,24            HH
·1670 DATA 3,21,13,4,1,14,5,6              MN
·1680 DATA 20,5,13,21,5,18,7,6             KB
·1690 DATA 1,7,19,1,3,6,5,14               HH
·1700 DATA 6,5,25,6,5,26,6,9               HF
·1710 DATA 5,6,15,2,6,15,16,7              OP
·1720 DATA 1,18,8,1,23,8,5,23              MI
·1730 DATA 8,15,2,8,15,4,13,1              CF
·1740 DATA 23,13,5,23,13,8,15,13           LG
·1750 DATA 15,20,14,5,2,14,9,2             OK
·1760 DATA 15,2,9,15,12,5,15,22            AG
·1770 DATA 1,18,5,22,16,1,19,16            GH
·1780 DATA 15,9,16,25,24,18,5,13           HE
·1790 DATA 18,5,16,19,9,3,19,15            KG
·1800 DATA 12,12,5,9,20,1,23,20            BC
·1810 DATA 9,3,20,15,18,20,21,14           PF
·1820 DATA 22,9,1,1,12,2,23,1              NJ
·1830 DATA 14,13,9,12,23,5,14,23           LB
·1840 DATA 15,11,25,1,8,25,1,23            GJ
·1850 DATA 25,5,14,25,5,23,25,9            HC
·1860 DATA 16,2,18,1,15,6,20,21            II
·1870 DATA 13,16,2,5,25,12,5,1             DB
·1880 DATA 0,0,0,0,0,0,0,0                 KH
·1890 DATA 0,0,0,0,0,0,0,0                 KN
·1900 DATA 0,0,0,0,0,0,0,0                 JL
·1910 DATA 0,0,0,0,0,0,0,0                 MB
·1920 DATA 0,0,0,0,0,0,0,0                 MP
·1930 DATA 0,0,0,0,0,0,0,0                 LF
·1940 DATA 0,0,0,0,0,0,0,0                 OD
·1950 DATA 0,0,0,0,0,0,0,0                 OJ
```

SCREEN POCUS 64

FROM PAGE 52

BASIC LOADER

```
·10 SA=49152                                                FG
·20 FORI=SATOSA+200:READA:POKEI,A:CK=CK+A
 :NEXT                                                      LC
·30 IFCK<>26102THENPRINT"ERROR IN DATA":S
 TOP                                                        FL
·50 A=SA+6:B=INT(A/256):C=A-B*256:POKESA+
 1,C:POKESA+2,B                                             AJ
·60 A=SA+51:B=INT(A/256):C=A-B*256:POKESA
 +5,B:POKESA+4,C                                            MB
·70 A=SA+164:B=INT(A/256):C=A-B*256:POKES
 A+154,B:POKESA+153,C                                       EH
·100 DATA76,6,192,76,51,192                                 DO
·110 DATA169,0,141,54,3,141                                 GA
·120 DATA55,3,141,56,3,141                                  FG
·130 DATA57,3,169,234,141,40                                IG
·140 DATA3,169,249,141,14,212                               JL
·150 DATA169,238,141,15,212,169                             EK
·160 DATA0,141,24,212,169,129                               LI
·170 DATA141,18,212,169,160,141                             DF
·180 DATA136,2,96,162,0,169                                 IE
·190 DATA4,133,252,134,253,134                              KL
·200 DATA251,169,160,133,254,165                            DF
·210 DATA1,41,254,133,1,173                                 LM
·220 DATA27,212,168,177,251,209                             PL
·230 DATA253,240,54,177,253,145                             LI
·240 DATA251,162,0,189,54,3                                 OB
·250 DATA240,7,232,224,4,144                                AJ
·260 DATA246,176,85,230,254,230                             HL
·270 DATA252,165,252,201,8,144                              AA
·280 DATA218,169,4,133,252,169                              BH
·290 DATA160,133,254,165,2,141                              FF
·300 DATA52,3,160,25,136,208                                ED
·310 DATA253,206,52,3,208,246                               JC
·320 DATA24,144,192,140,53,3                                FK
```

```
·330 DATA173,27,212,201,128,144          JN
·340 DATA5,169,200,24,144,2              BP
·350 DATA169,136,141,164,192,172         FK
·360 DATA53,3,177,251,209,253            JN
·370 DATA208,173,200,204,53,3            KG
·380 DATA208,244,165,252,56,233          IJ
·390 DATA4,168,169,1,153,54              HF
·400 DATA3,24,144,157,169,4              MO
·410 DATA141,136,2,169,237,141           NM
·420 DATA40,3,165,1,9,1                  PH
·430 DATA133,1,96                        LL
```

DEMO

```
·10 POKE53280,0:POKE53281,0:PRINT"[CLEAR]
 [c 7]";:POKE2,100                       ID
·14 DIMV$(24):V$(0)="[HOME]"             OJ
·15 FORI=1TO24:V$(I)=V$(I-1)+"[DOWN]":NEX
 T                                       JO
·16 B$="":FORI=1TO39:B$=B$+" ":NEXT:B$="[
 RVSON]"+B$                              NM
·20 FORI=1TO71:PRINT"SCREEN POCUS! ";:NEX
 T:SYS49152                              DK
·52 PRINT"[CLEAR]"V$(8);                 MI
·53 PRINTTAB(14)"[RVSON][14" "]"         EP
·55 PRINTTAB(14)"[RVSON][4" "]SCREEN[4" "
 ]"                                      DH
·56 PRINTTAB(14)"[RVSON][4" "]POCUS![4" "
 ]"                                      AD
·57 PRINTTAB(14)"[RVSON][14" "]"         BD
·58 PRINTTAB(14)"[RVSON][4" "]*DEMO*[4" "
 ]"                                      KL
·59 PRINTTAB(14)"[RVSON][14" "]"         AF
·60 PRINTV$(23)TAB(13)"PRESS ANY KEY[3"."
 ]"                                      NL
·65 FORI=1TO700:NEXT                     OD
·70 SYS49155                             PM
·90 GETA$:IFA$=""THEN90                  JE
·100 POKE2,1:SYS49152:PRINT"[CLEAR]";    BK
·120 SYS49155:SYS49152                   AB
·130 PRINT"[CLEAR][YELLOW]"V$(7)TAB(6)"FA
 DE SPEED MAY BE CONTROLLED!"            JD
·140 PRINTV$(10)TAB(6)"SCREENS MAY FADE O
 UT/IN"                                  DM
·150 PRINTV$(11)TAB(6)"SIMULTANEOUSLY!"  HG
·160 PRINTV$(14)TAB(6)"ALL FOR [RVSON] NE
 AT [RVSOFF] PRESENTATIONS!"             EO
·170 POKE53280,6:POKE53281,6:SYS49155    JO
·181 PRINTV$(23)TAB(12)"PRESS ANY KEY[3".
 "]"                                     KN
·182 GETA$:IFA$=""THEN182                CO
·190 X=1:FORJ=1TO101STEP50:POKE2,J:PRINT"
 [CLEAR]":SYS49152:PRINT"[CLEAR]";       HG
·200 FORI=1TO120:PRINT" SCREEN ";:NEXT   LP
·220 GOSUB300:SYS49155:SYS49152:PRINT"[CL
 EAR]";                                  OB
·230 FORI=1TO120:PRINT" POCUS  ";:NEXT   KN
·250 GOSUB300:SYS49155:SYS49152:PRINT"[CL
 EAR]";                                  NL
·260 FORI=1TO120:PRINT" MAGIC! ";:NEXT   MG
·270 GOSUB300:SYS49155:X=X+1:FORDY=1TO500
 :NEXTDY,J                               CL
·280 POKE2,70:SYS49152:PRINT"[CLEAR]";:FO
 RI=1TO23:PRINTB$:NEXT                   KF
·290 PRINTV$(10)TAB(7)"[RVSON]PRESS ANY K
 EY TO RESTART"                          IL
·292 SYS49155:SYS49152:PRINT"[CLEAR]"    EG
·295 GETA$:IFA$=""THEN295                IF
·296 POKE53280,0:POKE53281,0:SYS49155:RUN OM
·300 PRINTV$(12)TAB(16)"[RVSON]SPEED="MID
 $(STR$(J),2):RETURN                     KA
```

TRI WORDS

Continued from page 18

ADD are not allowed), if the letters are in the current grid, if the word has already been used, or if the word is a word at all. After passing all the tests, the word will be printed on your board on the left side of the list.

If you feel all possible words have been selected, or if you wish to quit, enter three "at" signs (@@@) to challenge the computer. The computer will try to guess one more word. If it succeeds, the computer wins. If it fails, the game ends in a tie. Of course, the computer can also inform you that it is stumped and will declare you the winner. The length of a game will vary depending on the 16 letters chosen, as well as the level you have selected.

The game is challenging and can help you expand your vocabulary while providing hours of entertainment. If the computer selects a word you are not familiar with, use the opportunity to learn a new word by looking it up in the dictionary. □ ***SEE PROGRAM LISTINGS ON PAGE 70***

...COMING IN THE JANUARY ISSUE OF *AHOY!* (ON SALE DECEMBER 6)...

COMPLEX IMAGES
CREATING FRACTAL GRAPHICS

THE YEAR'S BEST GAMES
1988'S TOP ENTERTAINMENT TITLES

- **ART GALLERY**
- **COMMODARES**
- **TIPS AHOY!**

AND ALL YOUR OTHER FAVORITE FEATURES



NOW PLAYING AT A SOFTWARE DEALER NEAR YOU

Available for Amiga, Commodore 64, IBM PC, Apple IIgs, and Atari ST, which are trademarks respectively of Commodore-Amiga, Commodore Electronics, Ltd., International Business Machines, Apple Computer Inc., and Atari Inc.

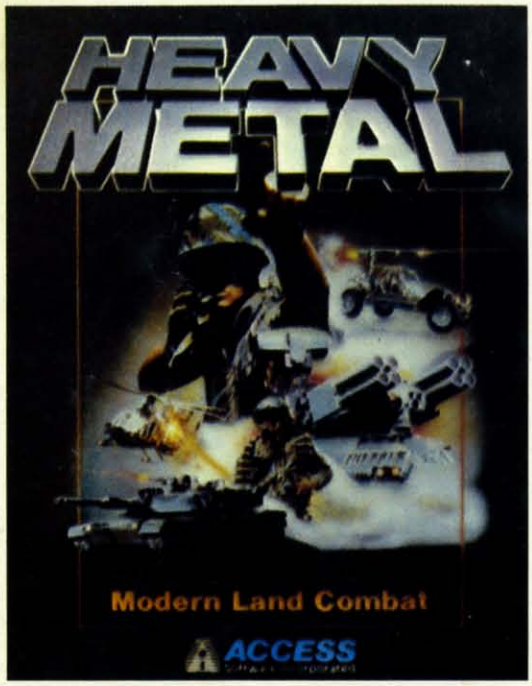
Cinemaware Corporation, 4165 Thousand Oaks Blvd., Westlake Village, CA 91362

Circle #199 on Reader Service Card

AVAILABLE FOR COMMODORE 64/128, AMIGA, IBM & COMPATIBLES

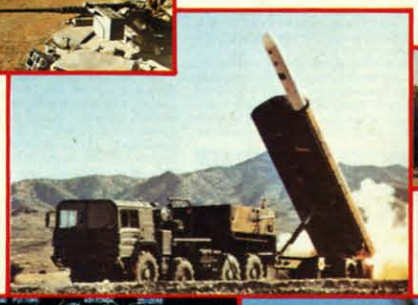
HEAVY METAL IS SOLID GOLD!

Ever had that urge to be in command? To lead men against superior enemy forces . . . ? . . . Sure you have. But only the "legally brain dead" want to be shot at for real. Well partner, fire up **HEAVY METAL** for an experience infinitely better than the 'real' thing.



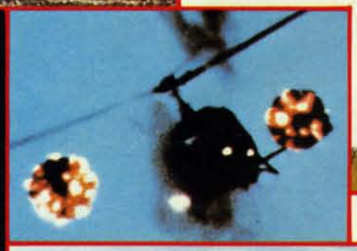
Start out in the War Room devising a strategy to overrun enemy positions. Now jump inside an M1A1 Abrams main battle tank and feel the power of one of the most destructive land combat vehicles ever built. Your trigger finger itches when your 120mm cannon is loaded . . . An enemy tank appears on your laser range finder . . . fire . . . a direct hit and pieces are scattered from here to Anchorage. Or hop behind the wheel of the XR311 FAV (Fast Attack Vehicle). This hot little beauty looks like a dune buggy, moves at speeds over 100 mph and is armed with TOW missiles. It's not a Lamborghini or a Porsche, but it easily blows them off the road.

Time to power up your ADATS (Air Defense Anti Tank System) and start knocking down incoming MIG Fighters. Seems easy until they start coming in 6 or 8 at a time. Now you're in serious trouble. But don't forget, you're also the Company Commander. Charlie Company is on the horn and wants to know what to do. Attack? . . . Fall Back? . . . Just received word that your defense perimeters have been overrun and the General's on the Line. He wants to know what's going on up here???











Do you have what it takes to move up the ranks in todays army? Take the **HEAVY METAL** challenge and find out!

Some were born to lead, others to follow. Maybe it's time to re-evalutate.


AMIGA


C-64


C-64


AMIGA


AMIGA

ACCESS™ Software Incorporated

Circle #165 on Reader Service Card

If you can't find our products at your local dealer, you can order direct. For mail orders, enclose check or money order, plus $1.00 shipping and handling, and specify machine version desired. Order by phone on VISA, MasterCard or C.O.D. by calling TOLL FREE (800) 824-2549.
ACCESS SOFTWARE, INC., 545 W. 550 S., Suite 130, Bountiful, UT 84010.

Q-link

Get a Commodore® 300 or 1200 baud modem at the lowest price anywhere when you join Q-Link now.



DETAILS INSIDE

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 5563 VIENNA, VA.

POSTAGE WILL BE PAID BY ADDRESSEE

Q-Link℠
8619 Westwood Center Drive
Vienna, Virginia 22180

SUBSCRIBE TO Ahoy!

Save more than 33% off the newsstand price

☐ One Year (8 issues) $16.95 (Outside US $22.95)
☐ Two Years (16 issues) $31.95 (Outside US $42.95)

☐ Payment enclosed: $_____ ☐ Please bill me.
☐ MasterCard ☐ VISA Card #_____ Exp. Date_____

Signature_____

Name_____

Address_____

City_____ State_____ Zip_____

B1288

SUBSCRIBE TO THE Ahoy! DISK MAGAZINE

Save more than 38% off the newsstand price

☐ One Year (8 issues) $65.00 (Outside US $90.00)
☐ Two Years (16 issues) $120.00 (Outside US $160.00)

☐ Payment enclosed: $_____ ☐ Please bill me.
☐ MasterCard ☐ VISA Card #_____ Exp. Date_____

Signature_____

Name_____

Address_____

City_____ State_____ Zip_____

B1288

December 1988 *Ahoy!* Void After March 8, 1989

READER SERVICE CARD

To request additional information on any product advertised or otherwise pictured in this issue of *Ahoy!* that is accompanied by a reader service number, circle the corresponding number below and mail this card. We will promptly forward your request to the designated companies.

101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190
191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250
251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280
281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310

A. Please check whether you are...
1. ☐ male ☐ female

B. What is your age?
1. ☐ under 18 2. ☐ 18-24 3. ☐ 25-34
4. ☐ 35-44 5. ☐ 45-54 6. ☐ 55-64 7. ☐ 65+

C. Education level completed
1. ☐ elementary 2. ☐ high school
3. ☐ junior college 4. ☐ college graduate
5. ☐ master's degree 6. ☐ PhD

D. From which of the following sources did you obtain your copy of *Ahoy!*?
1. ☐ newsstand 2. ☐ subscription (mail)
3. ☐ from a friend or family member
4. ☐ other _____

If not currently a subscriber, do you plan to become one?
1. ☐ yes 2. ☐ no

Name_____

Address_____

City_____ State_____ Zip_____

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 65 MT. MORRIS, ILL.

POSTAGE WILL BE PAID BY ADDRESSEE

Ahoy!

P.O. BOX 341
MT. MORRIS, IL 61054-9925

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 65 MT. MORRIS, ILL.

POSTAGE WILL BE PAID BY ADDRESSEE

Ahoy!

P.O. BOX 341
MT. MORRIS, IL 61054-9925

PLACE
STAMP
HERE

AHOY! MAGAZINE
P.O. BOX 8471
Boulder, CO 80329-8471